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THE PHYSICAL GEOGRAPHY OF NEW YORK STATE.

PART XI.—THE CLIMATE OF NEW YORK.

BY

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BASIS FOR A STUDY OF NEW YORK CLIMATE.—The State of New York affords an exceptionally favorable and interesting field for the study of climate, owing to the diversity of its physical features, as well as to the wide variety of atmospheric influences to which it is subject. It is not surprising, therefore, to find that the first organization for local climatic observation in America was that inaugurated in 1826 by the New York Board of Regents at numerous academies under their supervision, and which was continued without a break at several stations until 1863. After that time meteorological records were maintained by a few scattered observers co-operating with the Smithsonian Institution; and in 1870–71, five fully equipped stations were established in the principal cities by the U. S. Signal Service.

The State Weather Bureau was created by act of the Legislature in 1890, and, with the aid of over one hundred voluntary observers, its work was carried on for ten years, when the organization passed under the control of the National Weather Bureau. A great mass of data has thus been accumulated for the use of the climatologist, and may be found in the various publications mentioned in the footnote*; but in view of the improvements which have of late years

* 1—Essay on the Climate of New York, by F. B. Hough, Albany, 1857.

2—A Letter on the Climate of New York, by J. H. Coffin, contained in the "Natural History of New York State," Albany, 1843.

been made in instruments and method of observation, the investigator will find it best to depend upon the later observations, as far as practicable, and especially so when *dealing with temperature values.*

GENERAL FEATURES OF CLIMATE.—Glancing briefly at the general features of terrestrial climate and air circulation which govern and include our local conditions, we have first to consider the effects of geographical position upon temperature, as shown in the

* ISOTHERMAL LINES OF THE NORTHERN HEMISPHERE AND WINDS OF THE UNITED STATES.

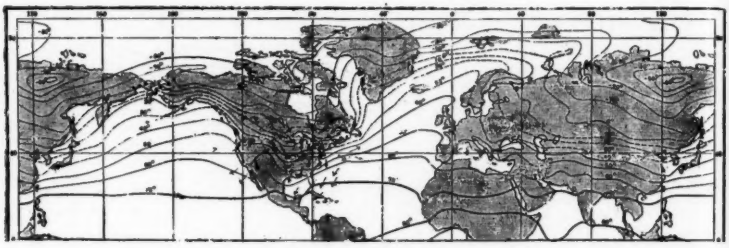


FIG. 1.—JANUARY.

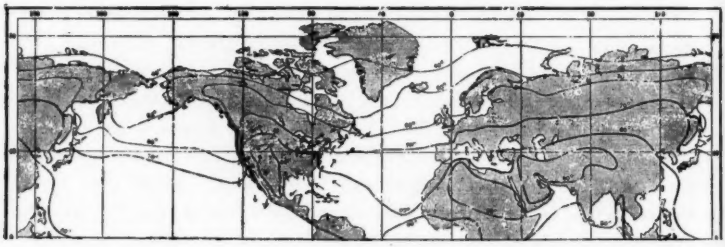


FIG. 2.—JULY.

accompanying isothermal charts of the northern hemisphere. The

3—Climatology of the United States by Laurin Blodgett, Philadelphia, 1857.

4—Observations of the N. Y. Board of Regents, Albany, 2 vols.

5—Atmospheric Temperature and Precipitation in the United States, by C. A. Schott, Smithsonian Contributions to Knowledge, Washington, 1876 and 1881.

6—Monthly Reports of the U. S. Signal Service and Weather Bureau, Washington.

7—Monthly Reports of the N. Y. State Weather Bureau, Ithaca.

8—The Climate of New York State, by E. T. Turner, contained in the 5th and 9th Annual Reports of the New York Weather Bureau, Albany.

* NOTE.—Fig. 1. The line of 20° passes through N. New York.

NOTE.—Fig. 2. The line of 70° passes through Central New York.

position and trend of the lines of equal temperature are determined by three factors:

Firstly, the decrease of temperature which occurs as we proceed northward. The average rate of this is 1° F. of annual temperature per degree of latitude.

Secondly, the rapidity of absorption and radiation of heat from land surfaces, as contrasted with the thermal stability of bodies of water. The difference between midsummer and midwinter temperatures in the interior of the American continent and over the Atlantic, at our latitude, is shown approximately as follows:

	MEAN FOR JANUARY.	MEAN FOR JULY.	RANGE OF MO. MEANS.	RANGE OF EXTREMES.
Atlantic	50	66	16	27
Interior	8	72	64	126

There is also quite as marked difference in the *daily* range of temperature between the land and the ocean.

Thirdly, the transfer of air from region to region, by means of the atmospheric circulation, tends in a marked degree to diffuse and equalize climatic conditions. The most important of these wind systems are as follows:

(*a*) The southwesterly winds which prevail over the temperate zone, in consequence of the heat circulation between high and low latitudes, conjoined with the earth's rotation. These may be called *Planetary Winds.*

(*b*) Winds of the monsoon type, blowing landward in summer and seaward in winter, as the result of unequal thermal conditions of continents and oceans.

(*c*) Winds accompanying those rapidly shifting areas of high and low barometer, known, in their most pronounced form, as cyclonic storms and anticyclones, respectively (see fig. 4, page 106); air flowing *toward* centres of low pressure, and *out from* centres of high pressure. It is important to note, in this connection, that in the northern hemisphere the rotation of the earth tends constantly to deflect air currents toward the right of their direction of motion; hence the circulation about high and low areas is not direct, but spirally inward and outward.

The general westerly circulation (*a*) evidently must tend to

bring the moisture and equable temperature of the ocean well inland over the western sides of the continents, as we find to be the case on our Pacific slope and along the northwest coast of Europe; while in a similar manner the conditions of the continental interior will more generally prevail along the eastern coasts. The two cases are fairly presented by the following:

TABLE OF MEAN TEMPERATURES.

		MIDSUMMER.	MIDWINTER.	DIFFERENCE.
West Coast.....	San Francisco.....	60°	50°	10°
Interior.....	St. Paul.....	72	8	64
East Coast.....	New York City.....	74	31	43
West Coast.....	London, Eng.....	64	38	26

The monsoons (class *b*) in winter strengthen the dry, cold winds from the interior eastward toward the ocean, but in summer tend to reverse the east-moving current; hence we must expect the continental type of climate to be much more strongly felt over the eastern States in winter than in summer. It must be noted, however, that the summer monsoon does not reach us directly as a cool sea-wind, since it is not strong enough to overcome the eastward drift until we approach the southern States and Mexican Gulf; but passing inland, over that semi-tropical region, it unites with the general current, and reaches us as the warm and moist southwesterly wind of summer, giving the abundant rainfall characteristic of that season.

Finally, the temporary winds of class *c* are responsible for the *variability* of weather which is so marked a feature of our climate. The low barometer areas of America move eastward at an average rate of 800 miles per day, and in the large majority of cases pass centrally over the vicinity of the Great Lakes and St. Lawrence valley, drawing in masses of air from the ocean and the south, at the same time giving rain or snow over the northeastern States. These disturbances recur at intervals of three or four days, on an average, in winter, but with less frequency and strength in summer. They are generally followed by high-pressure systems from the interior, whose outflowing winds are characteristically dry and cold; so that, in fact, our winter climate is made up of constant alternations of maritime and continental conditions.

Figure 3 shows graphically the fluctuations of temperature and weather to which New York is subject, and their close relation to

AVERAGE DAILY TEMPERATURE AND PRECIPITATION OVER THE STATE 1898

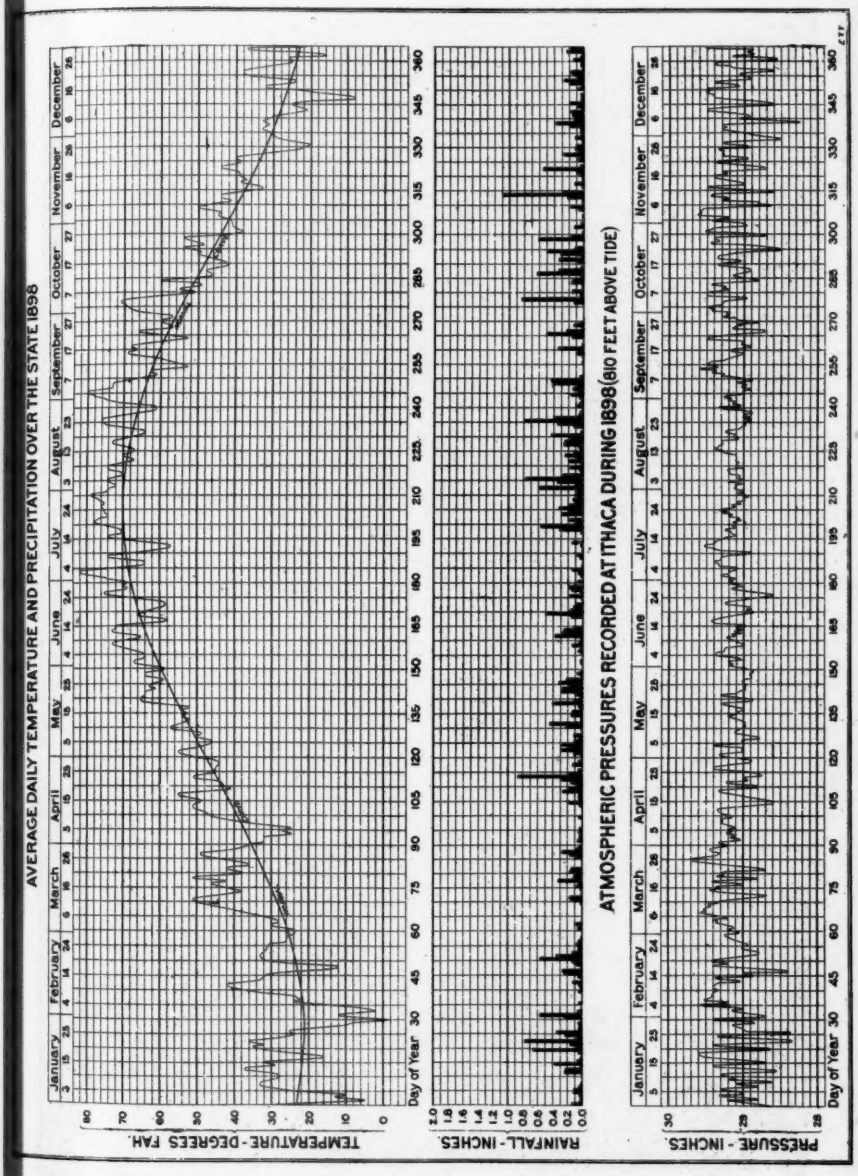

AVERAGE DAILY TEMPERATURE AND PRECIPITATION OVER THE STATE 1898
ATMOSPHERIC PRESSURES RECORDED AT ITHACA DURING 1898 (810 FEET ABOVE TIDE)
January
February
March
April
May
June
July
August
September
October
November
December
Day of Year
TEMPERATURE - DEGREES FAH.
RAINFALL - INCHES.
PRESSURE - INCHES.

FIG. 3.

HIGH
30.6
30.5
30.2
30.1
30.0
29.9
29.8
29.7
29.6
29.5
ZERO
10
20
30
40
50
EXPLANATORY NOTES.
Observations taken at 8 a. m., seventy-fifth meridian time. Air pressure reduced to sea level.
Isobars, or continuous lines, pass through points of equal air pressure.
Isotherms, or dotted lines, pass through points of equal temperature.
Symbols indicate state of weather: clear; partly cloudy; cloudy; R rain; S snow; M report missing; Arrows fly with the wind.
Shaded areas when used show regions of precipitation during past 24 hours.
"T." in table, indicates amount too small to measure.
Statute Miles
W. H. D.

the passage of high and low barometer areas near the State. (It should be noted that the temperatures indicated by the wave-line are the daily averages for the entire State, and not the local extremes of heat and cold.)

The conditions attending a cyclonic storm and the succeeding anti-cyclone are shown by the accompanying weather-map (Fig. 4) for 8 A.M., February 13th, 1900. The tracings of the self-recording barometer and thermometer at Ithaca on the same date are reproduced in Fig. 5, together with the wind direction. It will be seen

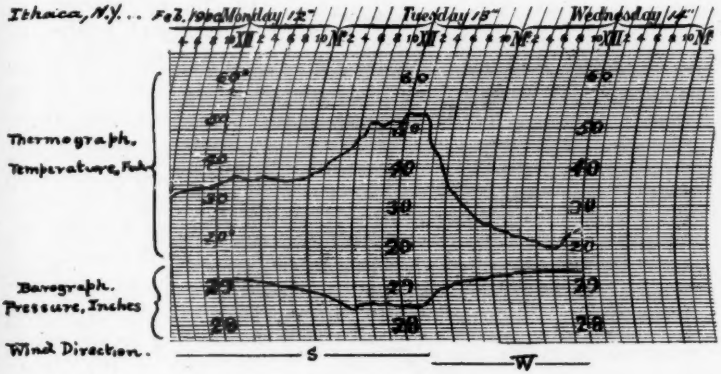


Fig. 5. Temperature Pressure and Wind Direction at Ithaca. Feb 12th to 14th

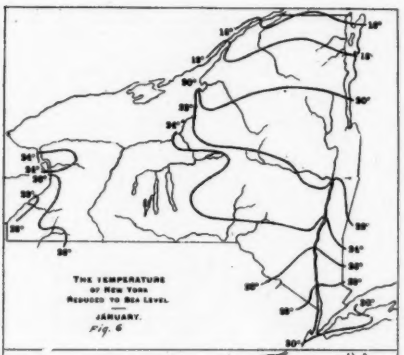
that the approach of the storm, indicated by a falling barometer, gave southerly winds and rising temperature until 2 P.M., when the storm centre passed nearest the station. The wind then immediately shifted to the westward, increasing in force, and at the same time the temperature fell, at first very suddenly, and then gradually, until the crest of the "high" passed on the following day.

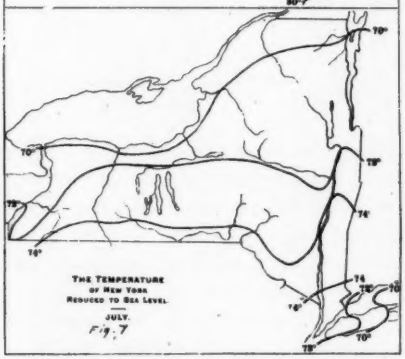
The element technically known as *variability* of temperature, *i. e.*, the average difference from day to day, amounts to over 10° in Maine and Quebec, for the month of January, when the maximum value is reached. The mean value for New York State is 8°; over the south Atlantic and Gulf coasts, 6°; on the coast of California, 2°.

In the immediate vicinity of our coast, the greater part of the annual precipitation occurs in winter, when the low areas are most frequent and intense; but in the interior of the State, heavy local

rains during the period of the summer monsoon bring the maximum fall of the year at that season.

Influence of Great Lakes.—We have thus far omitted to mention the important modifications of our climate due to the Great Lakes. These bodies of water follow the seasonal temperature changes much more closely than does the ocean, owing to their smaller mass; but nevertheless such scanty data as have been gathered indicate that the surface of Lake Ontario averages from 10° to 15° warmer in winter, and cooler in summer, than the adjacent land areas; hence the northwesterly winds of winter, in passing over the lake, are raised to a temperature considerably higher than obtains on the north shore. This influence is felt throughout the portions of the State lying to the south and east of the lakes, although decreasing rapidly as we proceed inland. In northern New York, on the other hand, the coldest winds of winter are not affected by the lakes, and in consequence the winters are much more severe than could be expected as a result of the higher latitude of the region alone.





The southerly winds which predominate during the warmer portion of the year, of course, reach this State uninfluenced by the lakes, hence the temperature conditions are much more uniform over our entire area than in winter. The tempering effect of the lakes and ocean is clearly brought out by the accompanying isothermal charts, from which other sources of variation have been largely eliminated by reduction of temperatures to sea-level.

LOCAL CLIMATE.

TOPOGRAPHICAL FEATURES.—The main portion of New York State is a broken and irregular plateau, whose average elevation is 1,200 to 1,500 feet above tide. This plateau is bordered on the west and northwest by considerable tracts of level lowland along the shores of the Great Lakes and the St. Lawrence River; while near the eastern border the valleys of the Hudson River and Lake Champlain form a deep channel extending from the seaboard directly northward into Canada.

Along the western side of this depression the highlands reach their greatest elevation in the mountain systems of the Adirondacks, Catskill, and several minor ridges; while on the east also the valley is closed in by the high hills of New England. The Hudson Valley is united to the lowlands of the Great Lakes by the narrow valley of the Mohawk, which divides the central plateau from that of the northern or Adirondack region. Among the more important minor depressions are the valleys of the Central Lakes and those of the Delaware and Susquehanna Rivers and their tributaries.

Elevations and depressions of land surface affect temperature conditions in three important ways:

Firstly, the temperature average for the day (24 hours) decreases with elevation at the rate of about 0.3° and 0.4° per hundred feet in winter and summer, respectively. This rule should give to the plateaux a temperature 4° to 6° lower than that at sea-level.

Secondly, the highlands act as a shelter or windbrake for the neighboring valleys; and this effect becomes very important in a territory so irregular as that of New York. The temperate climates of the various "fruit belts" of the State are due both to a sheltered situation and to the proximity of bodies of water.

Thirdly, a flow of cold dense air from the hill slopes to the valley bottoms occurs on clear, still nights, and frequently so much reduces the temperature of the lowlands as to cause severe frosts, which are escaped at higher levels; and, since the highest midday temperature also occurs in the valleys, their daily range is often excessive. The following example of the conditions in Central New York during a cold wave will sufficiently illustrate this point:

TEMPERATURE (FAHRENHEIT).

LOCATION.	Altitude.	JANUARY 9.			JANUARY 10.			JANUARY 20.			JANUARY 21.			FEBRUARY 6.		
		Max.	Min.	Range.	Max.	Min.	Range.	Max.	Min.	Range.	Max.	Min.	Range.	Max.	Min.	Range.
	Feet															
Oxford (Hill).....	1250	21	4	17	17	—8	25	11	—24	35	21	—10	31	22	—3	25
Brookfield (Val.).....	1350	24	—3	27	17	—16	33	6	—28	34	21	—17	38	30	—16	46

NOTE.—The rapid rise of the general surface of the eastern plateau brings the valley bottom at Brookfield above the level of Oxford. The distance between the stations is about thirty miles.

The different thermal conditions at hill and valley stations are also shown by tracings of thermographs in Fig. 8.

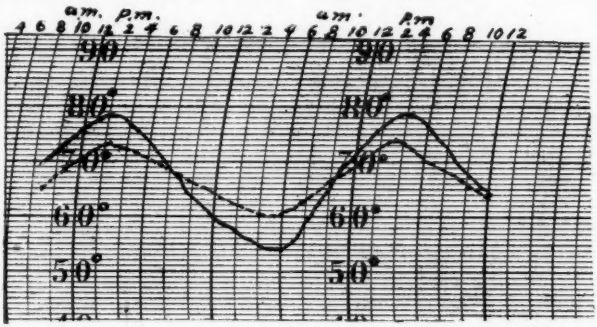


Fig 8 Temperature curves at Mountain and Valley stations of New York Aug 21st and 22d 189-
---Temp. at Minnewaska Elevation 1800 ft
— - - Port Jervis 470 "

The nocturnal valley-winds are an important climatic factor, since they bring a cool and refreshing air at night which is not felt on the plains or upper hill slopes. A special study of the subject has been made at Ithaca, in the Cayuga Lake valley, where it is found that the breeze usually arises from one to two hours after sunset, blowing from the south down the channels of the two principal streams flowing into Cayuga Lake, and gradually gaining a velocity of 10 or 12 miles per hour as the night advances. Small balloons set adrift at night were often observed to drift northward with this surface current until an altitude of 200 or 300 feet had been reached, when they were caught by the prevailing wind, and abruptly changed their course to the eastward.

FIG. 9.—MAP OF THE STATE OF NEW YORK SHOWING THE NORMAL TEMPERATURES FOR JANUARY.

We are now prepared to consider in more detail the temperature conditions of the State, as exhibited by the accompanying tables and charts (Figs. 9, 10 and 11).

FIG. 9.—MAP OF THE STATE OF NEW YORK SHOWING THE NORMAL TEMPERATURES FOR JANUARY.

FIG. 10.—MAP OF THE STATE OF NEW YORK SHOWING THE NORMAL TEMPERATURES FOR JULY.

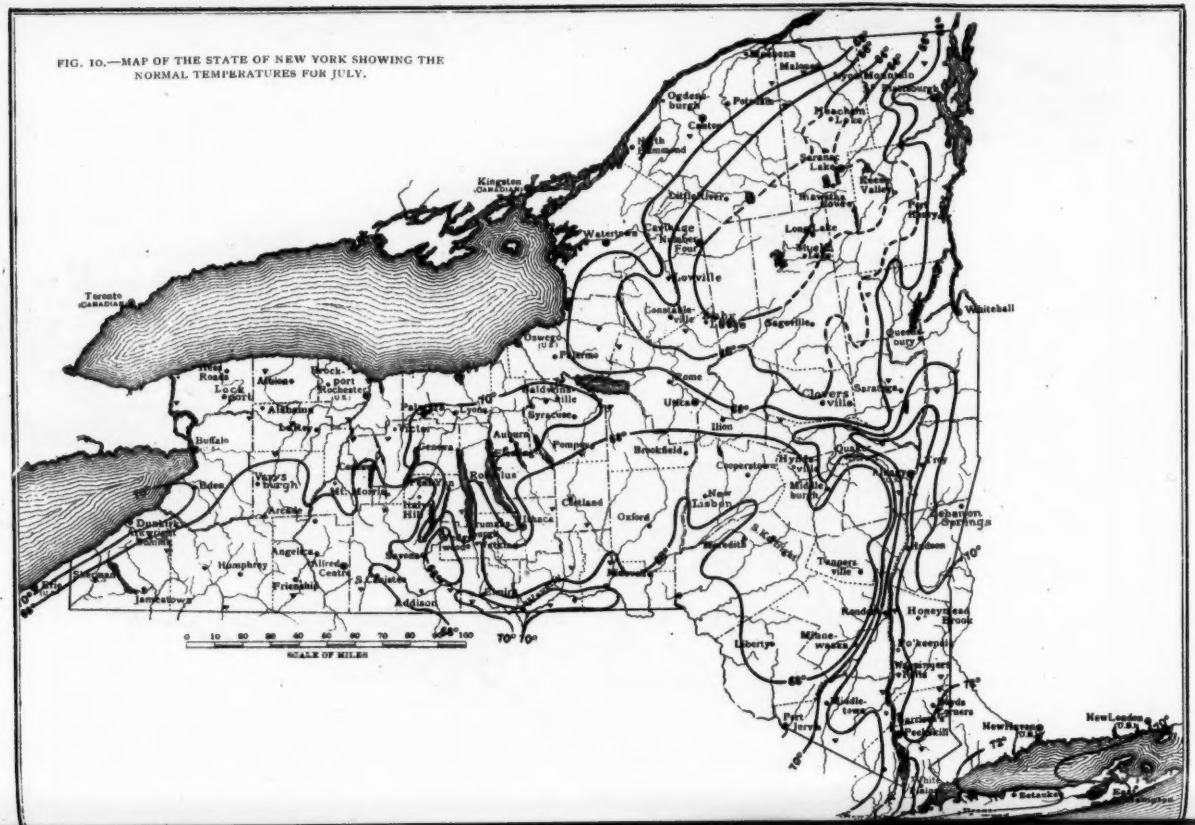


FIG. 11.—MAP OF THE STATE OF NEW YORK SHOWING THE NORMAL TEMPERATURES FOR THE YEAR.

FIG. 11.—MAP OF THE STATE OF NEW YORK SHOWING THE NORMAL TEMPERATURES FOR THE YEAR.

TABLE I.—MONTHLY AND ANNUAL TEMPERATURE AVERAGES, DERIVED FROM RECORDS OF TEN YEARS OR MORE.

REGION AND STATION.	MEAN TEMPERATURE (FAHR.).											
	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Year.
ATLANTIC COAST:													
Setauket, L. I.	31	30	36	47	58	67	72	71	65	54	44	36	51.0
New York City	30	31	37	48	60	69	74	72	66	55	44	34	51.7
CENTRAL PLATEAU:													
Cooperstown.	20	21	28	41	54	64	68	65	57	46	35	25	43.9
Angelica	22	22	30	43	55	65	68	64	58	46	36	26	44.6
NORTH'N NEW YORK:													
Number Four	17	17	25	39	52	61	64	62	56	44	32	22	41.0
Plattsburg	16	17	26	41	55	65	70	68	58	47	34	22	43.2
GREAT LAKES:													
Buffalo	25	25	31	42	54	65	70	69	62	51	39	30	46.8
Rochester	24	25	31	44	57	66	71	69	62	50	39	30	47.4
HUDSON VALLEY:													
Albany	23	24	32	46	59	69	72	71	63	51	39	29	48.3
ENTIRE STATE:													
(50 stations)	22	23	29	42	56	65	69	67	60	48	36	26	45.4

TABLE II.—EXTREMES OF TEMPERATURE FOR THE YEAR. FROM RECORDS OF THE PAST TEN YEARS.

REGION AND STATION.	ELEVATION.	MINIMUM.			MAXIMUM.		
		Average for entire period.	Lowest during entire period.	Highest Min. during period.	Average for entire period.	Highest during entire period.	Lowest Max. during period.
COAST:							
Setauket	40	+ 4	− 5	+12	95	98	88
New York City	300	+ 2	− 6	+10	95	99	91
HUDSON VALLEY:							
Albany	97	− 9	−16	− 4	96	100	94
CENTRAL PLATEAU:							
New Lisbon	1234	−19	−26	−13	92	94	87
Angelica	1340	−20	−27	−10	92	95	88
NORTHERN NEW YORK:							
Number Four	1571	−25	−31	−17	88	91	85
Canton	300	−27	−43	−15	94	98	90
Potsdam	300						
Plattsburg	180	−18	−25	−12	94	96	90
GREAT LAKES:							
Buffalo	770	− 3	−13	+ 7	90	95	84
Rochester	520	− 4	−10	+ 6	95	99	92

The Atlantic Coast Region.—The nearest approach to a maritime climate to be found within the territory of New York is that of Long Island. The values given for Setauket, in table 1, indicate a midwinter temperature nearly as high as that for Philadelphia, and 9° above the average for the State; while the midsummer temperature is but 3° above that average. The effect of the ocean and Sound in moderating the *daily* ranges, and especially the winter minima, is even more marked, so that the region is extremely well adapted to the raising and early marketing of tender fruits and vegetables. The first killing frost occurs, near the coast, about the beginning of November, and the last about the middle of April, on an average. Usually, during the winter, the ground is covered with snow for brief periods only.

The *sea breeze* is the most characteristic and important feature of maritime climate in summer. In fair weather the land-wind, which is usually felt at night, ceases soon after sunrise, and the temperature rises rapidly until 9 or 10 o'clock, when the cool breeze from the ocean sets in, gaining strength until early afternoon, when a velocity of 10 or 15 miles per hour may be attained. In general the breeze penetrates inland about ten miles, but on southern Long Island its force and penetration are greatly augmented by the prevailing southerly wind of summer. The accompanying diagram, exhibiting typical hot-weather temperature curves for an inland and coast station, brings out very clearly the moderation of midday heat due to the sea breeze. (Fig. 12.)

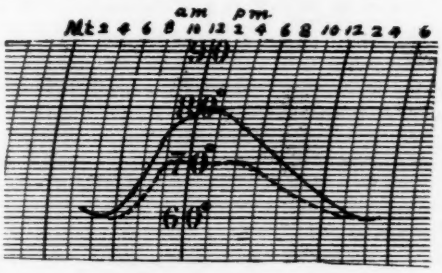


Fig. 12 Temperature as affected By Sea-Breeze.
— Inland Station
---- Sea Coast Station

The *Central Plateau*, extending from the Great Lake region on the west to the Hudson Valley on the east, has a more uniform temperature than might be expected to obtain over so large an area, since the general rise of the surface toward the south and east largely counterbalances the thermal effects resulting from proximity to the ocean and a more southerly latitude. Hence, we may consider the higher levels of this region to be fairly represented by the

averages given in the table for Angelica and Cooperstown. The temperature of this section is usually sufficiently low to maintain a continuous covering of ice and snow throughout the winter; but the larger valleys are subject to frequent thaws, which may leave the ground bare for considerable periods. Only hardy fruits can thrive on the highlands, and even in the valleys the temperature commonly falls low enough to damage, or even kill, peaches.

The midsummer maxima over the plateau average about 4° lower than on the lowlands, and at the summits of the higher hills and mountains the midday heat is, of course, still more moderate. (See fig. 8, p. 110.)

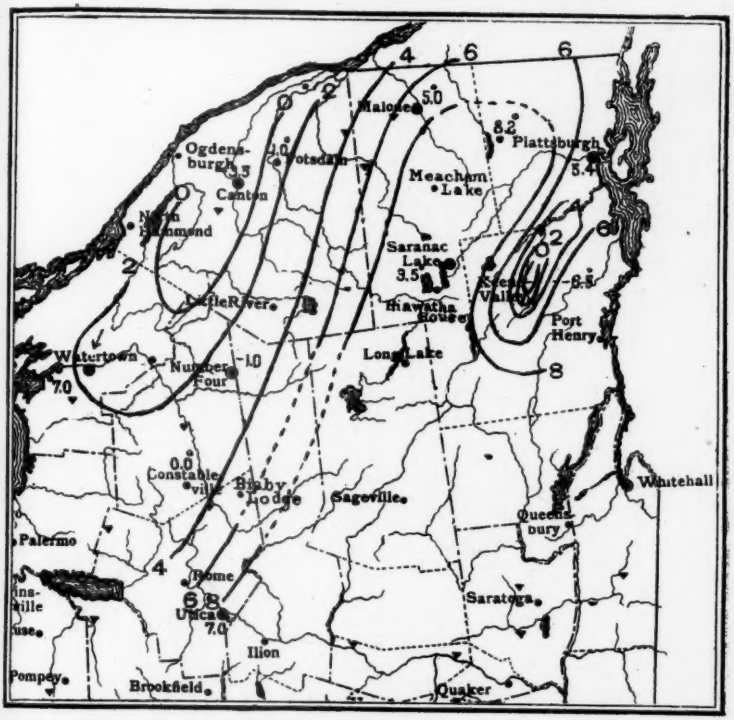
The average duration of ice in Otsego and Cazenovia lakes (altitude about 1,200 feet) is from December 15th to April 15th. The first killing frost is likely to occur as early as October 1st, and the last in May.

Northern New York has a *winter* climate almost as severe as that of the northern interior States, while the summer heat is nearly as great as at equal altitudes in southern New York; and since the region is largely exempt from maritime influences, it is especially liable to sudden and very abrupt changes of temperature. The lakes and forest tracts of the Adirondack mountains have usually a heavy covering of firm snow and ice from the latter part of November until the close of April, so that the air is much dryer during that period than in warmer portions of the State. To this fact, together with the presence of large areas of pine woodland, is probably due the favorable effect of the Adirondack climate upon lung diseases; an effect, however, which is shared by the higher regions of southeastern New York.

The minimum temperatures recorded in the St. Lawrence Valley are as low as those of the Adirondack region; in fact, the lowest temperature on record for this State (−46°) was observed at the border of the St. Lawrence Valley. There, as in all regions of contiguous mountain and lowland tracts, we may often observe that the temperature actually *increases* with altitude during the progress of a cold wave. This phenomenon, known as *inversion of temperature*, indicates that the cold which accompanies cloudless areas of high barometer is largely a surface phenomenon, due to loss of heat from the earth by radiation. The diagram given herewith shows a typical case of inversion, derived from the records of the State Weather Bureau. Had the temperature decreased with altitude, at the usual rate, a reduction of the values to sea-level would have given a uniform temperature for the entire region; whereas in this case the isotherm

of 0° is found at the lowest levels, and that of 8° in the highest portion of the Adirondacks.

FIG. 13.—INVERSION OF TEMPERATURE IN NORTHERN NEW YORK, DECEMBER 8TH, 1890.



ISOTHERMAL LINES SHOW THE MEAN DAILY TEMPERATURE AS REDUCED TO SEA LEVEL BY DEDUCTING 0.3° FROM THE ACTUAL TEMPERATURE FOR EACH 100 FEET OF ELEVATION. SMALL FIGURES SHOW ACTUAL TEMPERATURES. [THE MEAN TEMPERATURE AT KEENE VALLEY WAS—6.5°.]

Navigation on the St. Lawrence River is closed by ice, on the average, from about the middle of December until early in April.

The Champlain and Hudson valleys owe their high summer temperature to a sheltered position, as well as to the predominance of southerly winds throughout their extent at that season. The northerly winds of winter, on the other hand, have a clear sweep as far south as the high ridges of the lower Hudson Valley, so that the temperature is often nearly as low as upon the adjacent highlands. The advance of spring, however, is comparatively rapid, especially

to the southward of the Mohawk Valley; hence this region is well adapted to the growing of early vegetables and small fruits.

The broadest portion of Lake Champlain is commonly frozen over from January to early April. Navigation closes on the Hudson, at Albany, on December 16th, and opens on March 20th, for the average year.

The Lake Region.—Inspection of table I and Figs. 6 and 7 shows that the tempering effect of the Great Lakes is most marked in winter, when the prevailing winds must pass over their surface before reaching New York. This effect is clearly brought out by comparing the temperature recorded on the north and south sides of the lakes during the prevalence of a cold wave.

DATE.*	NORTH SHORE.		SOUTH SHORE.	
	KINGSTON.	TORONTO.	OSWEGO.	ROCHESTER.
January 19, 8 A.M.....	+ 2	+4	+12	+16
January 19, 8 P.M.....	− 6	0	+ 8	+12
January 20, 8 A.M.....	−22	−8	− 2	+ 6

* The winds were northerly throughout the observations.

Here Lake Ontario appears to have maintained the temperature at Rochester, from 14° to 28° above the point to which it would otherwise have fallen. The frequent occurrence of conditions similar to the above gives to the southern shore of Lake Ontario an average mid-winter temperature 5° higher than that of the northern shore. It thus becomes possible, in our lake district, to raise peaches, grapes and the tender vegetation which can scarcely exist in the adjacent portions of Canada, nor even in the southern interior of the State. The noted grape belt of Chautauqua County, in which over 30,000 acres of that fruit are under cultivation, owes its mild climate both to the proximity of Lake Erie and to the high hills which rise on the eastern side in a semi-oval form. Killing frosts rarely occur in this locality before the close of October; and their latest date in spring is usually previous to May 10th.

The eastern portion of Lake Erie is commonly frozen over during a portion of the winter, navigation being closed at Buffalo from early in December to April. Lake Ontario, owing to its greater depth, is less obstructed by ice, and at Oswego the period of navigation is two or three weeks longer than at Buffalo.

A small daily range of temperature obtains at Lake Stations in winter, owing to the almost constant cloudiness of the region as well as to the tempering effect of the water.

The thermal conditions of the Cayuga and Seneca Lake valleys are so similar to those of the Great Lakes that no special treatment of them is necessary. Cayuga Lake is seldom, and Seneca Lake never, frozen over completely. Their immediate shores have an equable temperature, which, with the shelter afforded by the surrounding hills, renders this region a favorable one for fruit culture.

PRECIPITATION.

The amounts of annual precipitation in different sections of the State are mainly determined: first, by proximity to various sources of vapor or vapor-laden air-currents; and, secondly, by the character of local topography. In the case of New York State, we may say that, under similar conditions, the precipitation is roughly proportional to the altitude of land-surfaces. This rule does not apply to the central and southern Atlantic States, whose mountain ridges are parallel to the prevailing direction of vapor-bearing winds.

As has been stated, the Atlantic Ocean furnishes the principal vapor supply of the northeastern States. While passing inland with easterly winds the moisture is, in the first place, largely precipitated over the mountains of New England, as is rendered apparent by the extraordinary rainfall on Mount Washington, averaging over 90 inches per annum. A similar condition no doubt exists through the Green Mountain system near the New York border; and hence the lowlands to the westward, including the Champlain and upper Hudson valleys, receive a somewhat deficient supply as compared with that of the State as a whole. A marked increase of rainfall is again found in the Adirondack highlands, and beyond these a decrease in the St. Lawrence valley.

Sea-winds from the southeast find no obstruction on the immediate coast of New York; but passing inland they meet the abrupt hill ranges of the southeastern counties, and give to each a copious rainfall as compared with that of the intervening valleys. Liberty, in the mountainous region of Sullivan County, also shows the direct influence of the sea-wind both by its large annual precipitation and by a pronounced secondary maximum in winter—a feature not noticed at stations further northward.

Western New York receives an appreciable portion of its vapor supply from the Gulf of Mexico, judging from the frequent southwesterly direction of the rain-winds, and also from similarities existing between the rain types of the Lower Lakes and those of the Gulf and the Mississippi and Ohio valleys. The total precipitation over the depressed area occupied by the Lakes is rather below

FIG. 14.—MAP OF THE STATE OF NBW YORK SHOWING THE AVERAGE PRECIPITATION FOR THE WINTER.

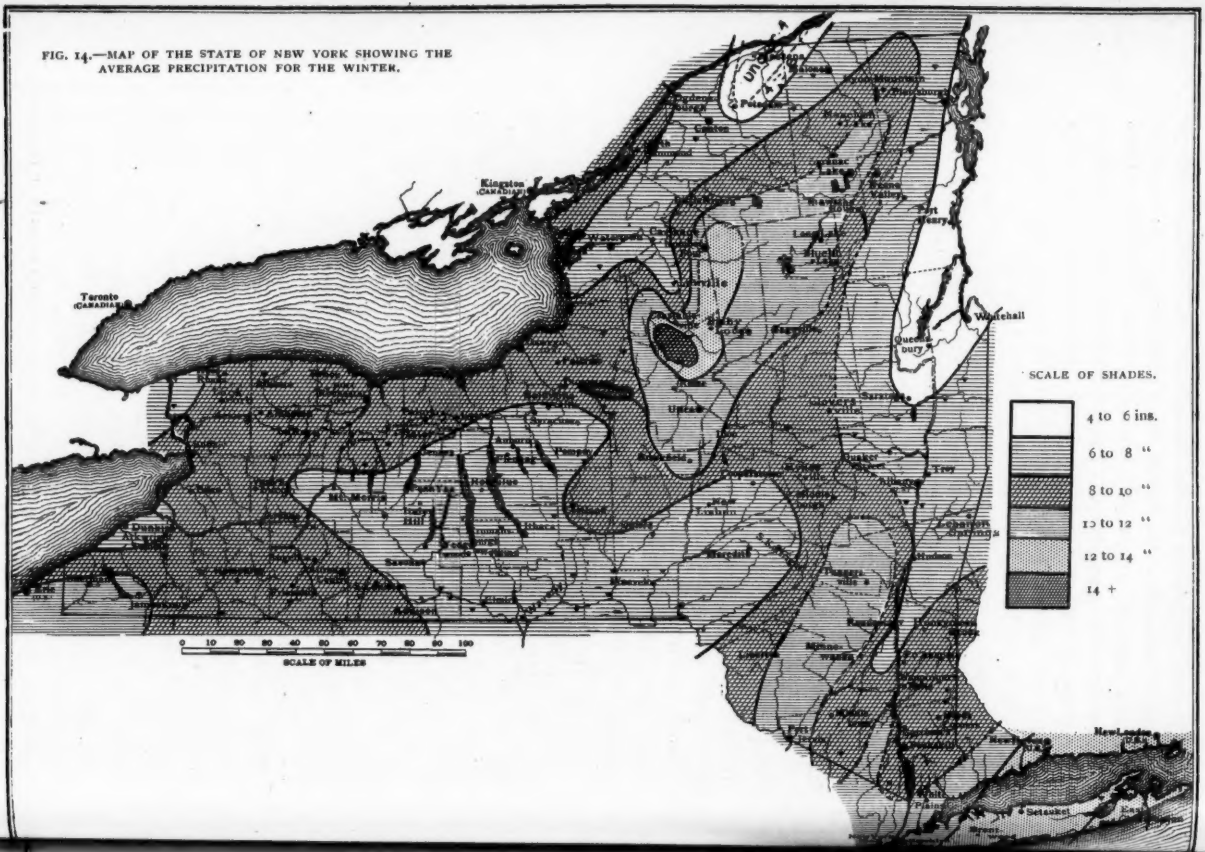


FIG. 15.—MAP OF THE STATE OF NEW YORK SHOWING THE

FIG. 15.—MAP OF THE STATE OF NEW YORK SHOWING THE AVERAGE PRECIPITATION FOR THE SUMMER.

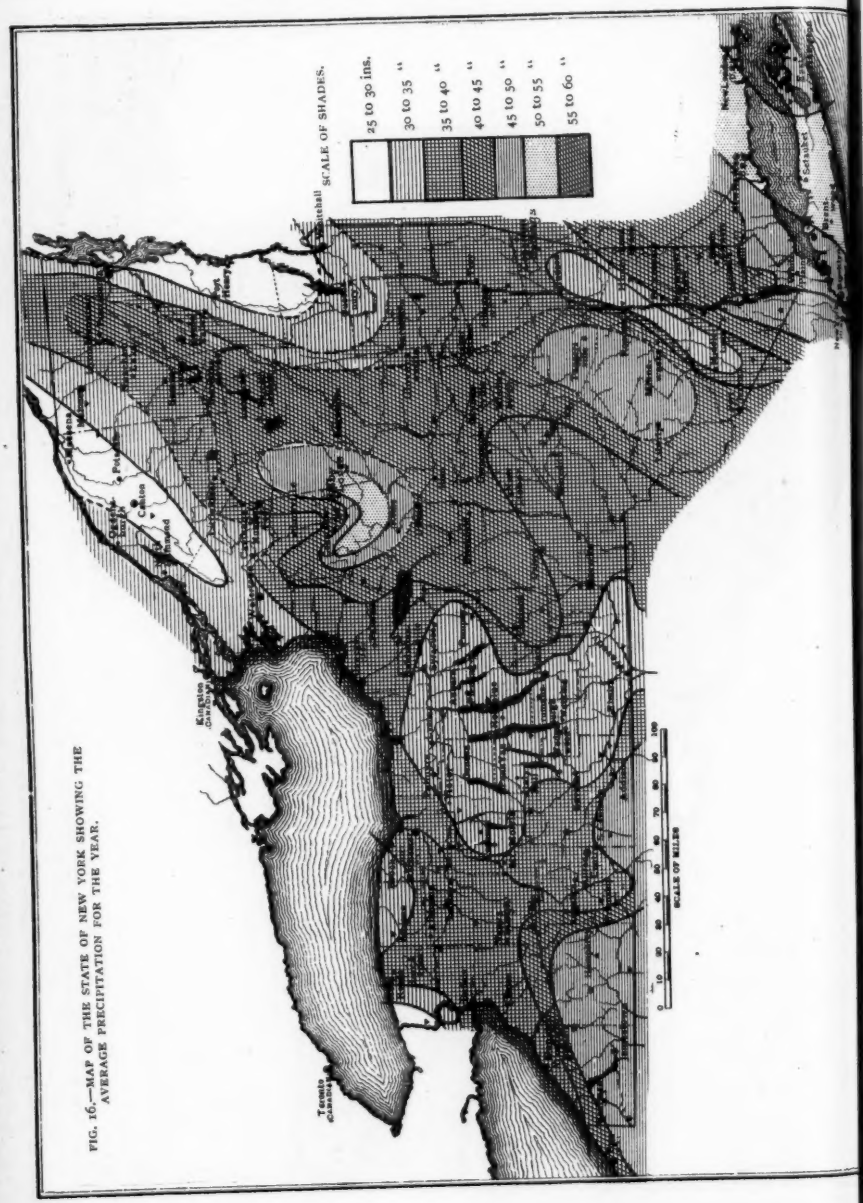


FIG. 16.—MAP OF THE STATE OF NEW YORK SHOWING THE AVERAGE PRECIPITATION FOR THE YEAR.

the average for the State; but, wherever the surface rises abruptly from their shores, the amount rapidly increases and considerably exceeds that common to equal altitudes in the interior. The winter maximum appears prominently in a large snowfall over the southwestern highlands, and still more so through a section including the hills of Lewis County, the upper Mohawk valley and an adjacent spur of the eastern highlands in Madison County.

The rainfall in central New York is generally abundant, although somewhat less than that of the southeastern and southwestern highlands. A deficiency, as compared with the average for the State, exists in the principal valleys of the Susquehanna system and also in the depression of the Central Lakes.

Records have not been kept long enough to establish, with accuracy, the amount of rainfall in the central Adirondack region. The brief series of observations obtainable from points near the eastern and western limits of the plateau have been carefully analyzed by comparison of individual monthly values with those of the adjacent stations in the Champlain and St. Lawrence valleys, the highlands showing a marked excess in all cases. The amounts of rain in the interior, shown by the accompanying charts, were estimated from the data of border stations, somewhat modified by the character of local topography.

Monthly and Seasonal Fluctuations of Rainfall.—The fluctuations in the average or normal amount of rainfall from month to month do not occur in a uniform manner over the entire area of New York, but must rather be classed under several quite distinct types, depending upon atmospheric conditions, which have already been summarily described. The character of various types and their important modifications are shown in considerable detail by Figures 17, 18 and 19.

A close approach to the continental type of rainfall, with its early summer maximum, is found over the central plateau regions (including the eastern and western plateaux and the southern Adirondack region), as represented by Cooperstown. Proceeding eastward to the central Hudson valley, a July maximum is found which extends through the Champlain valley and over the Province of Quebec. In the southern Hudson valley the maximum varies from July to August, while south of the highlands the maximum occurs in August. This condition also extends over Long Island to Setauket, but disappears at East Hampton and Block Island. The Great Lakes and St. Lawrence Valley show a June or July maximum, which, however, is secondary to that of autumn.

FIG. 17.

FLUCTUATIONS OF NORMAL RAINFALL.

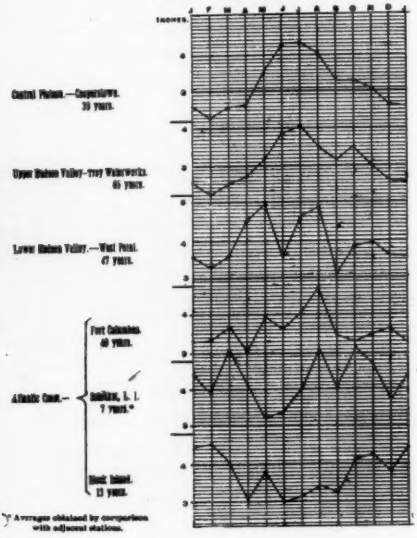

Central Plateau.—Cooperstown. 30 years.
Upper Hudson Valley.—Troy Waterworks. 65 years.
Lower Hudson Valley.—West Point. 47 years.
Atlantic Coast.—
Fort Columbus. 40 years.
Babylon, L. I. 7 years.*
Block Island. 13 years.
* Average obtained by comparison with adjacent stations.

FIG. 18.

FLUCTUATIONS OF NORMAL RAINFALL.

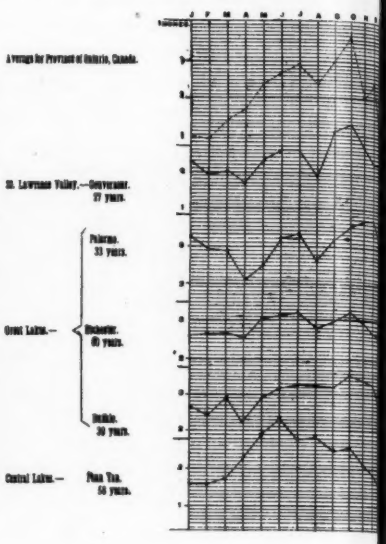
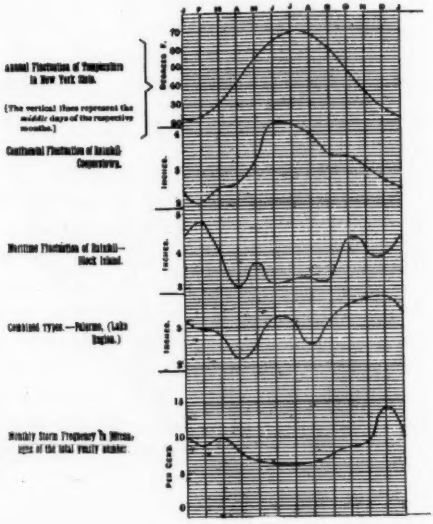


FIG. 19.

RELATION OF RAINFALL TO STORM FREQUENCY AND TEMPERATURE.


Annual Fluctuation of Temperature in New York State.
(The vertical lines represent the middle days of the respective months.)
Continental Fluctuation of Rainfall—Observatory.
Maritime Fluctuation of Rainfall—Block Island.
Cascade type.—Palermo. (Lake Region.)
Monthly Storm Frequency in Hundredths of the total yearly number.

AUTUMN RAINS.—Over the State, generally, a large precipitation obtains in October, as compared with the months immediately preceding and following. This constitutes the principal maximum of the year at several stations of the St. Lawrence Valley, the central part of the Great Lake Region, Central Long Island, and beyond the limits of New York, in New Brunswick, Nova Scotia, and Ontario. Within this State an October *minimum* is found only in the vicinity of New York city; but it is a feature common to the coast south of that point, and also obtains at several places in the interior of New England. A relatively light rainfall during September is characteristic of the State at large; whereas in the Upper Lake region the general autumn maximum occurs during that month. Erie, Pa., shows a November maximum, which feature also prevails in the Ohio Valley.

Over the greater part of the interior of New York the precipitation during the winter is the least of the year. Eastern Long Island, on the contrary, has its annual maximum at that season; while the coast stations generally appear to be about equally subject to continental and maritime influences, showing but slight seasonal variations. This is also true, in even a greater degree, of the region bordering the Lower Lakes, and Rochester may be taken as an example in which an annual fluctuation is almost wholly lacking. Oswego has a principal maximum in June, and a secondary in autumn and early winter; but the latter becomes predominant at Palermo, a few miles to the eastward, and attains a remarkable intensity along the ridge running parallel to the lake in Lewis County.

In the *spring*, a March maximum is very pronounced at the Atlantic coast stations, and is also observable inland in a lesser degree. A diminution again occurs in April, after which the curves of the continental type rise towards their summer maximum, corresponding to the change of prevailing winds from northerly to southerly which occurs in May.

Local Thunderstorms occur almost daily in some portions of the State during the summer months. They form most frequently over the high hills of southern and eastern New York, thence drifting in a general easterly direction, at a rate of about 30 miles per hour, often as far as the coast or over New England. Regions showing a pronounced summer maximum of rainfall, as a rule, owe this feature to frequent thunderstorms.

Figure 20 indicates the regions in which local thunderstorms most frequently originate, and the directions in which they are

most likely to move and spread out. Figure 21 shows the progress of a thunderstorm of a more general character, advancing

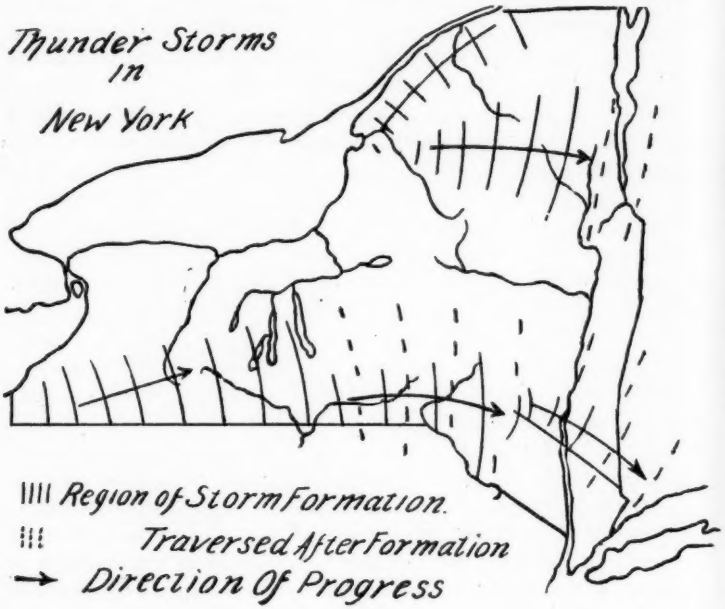


FIG. 20.

in front of a large high-pressure area, and preceding a change of weather.

FREQUENCY OF RAINY DAYS.

The accompanying table shows the average frequency with which a rain or snow fall amounting to one one-hundredth of an inch or more occurs, during each month, at six stations in New York and also at Block Island, R. I., and at Erie, Pa., the former station representing, approximately, eastern Long Island and the latter southwestern New York. The rainy days are here expressed in percentages of the total number of days in each month, following the method of the Signal Service charts, from which the values at all stations excepting Ithaca were derived.

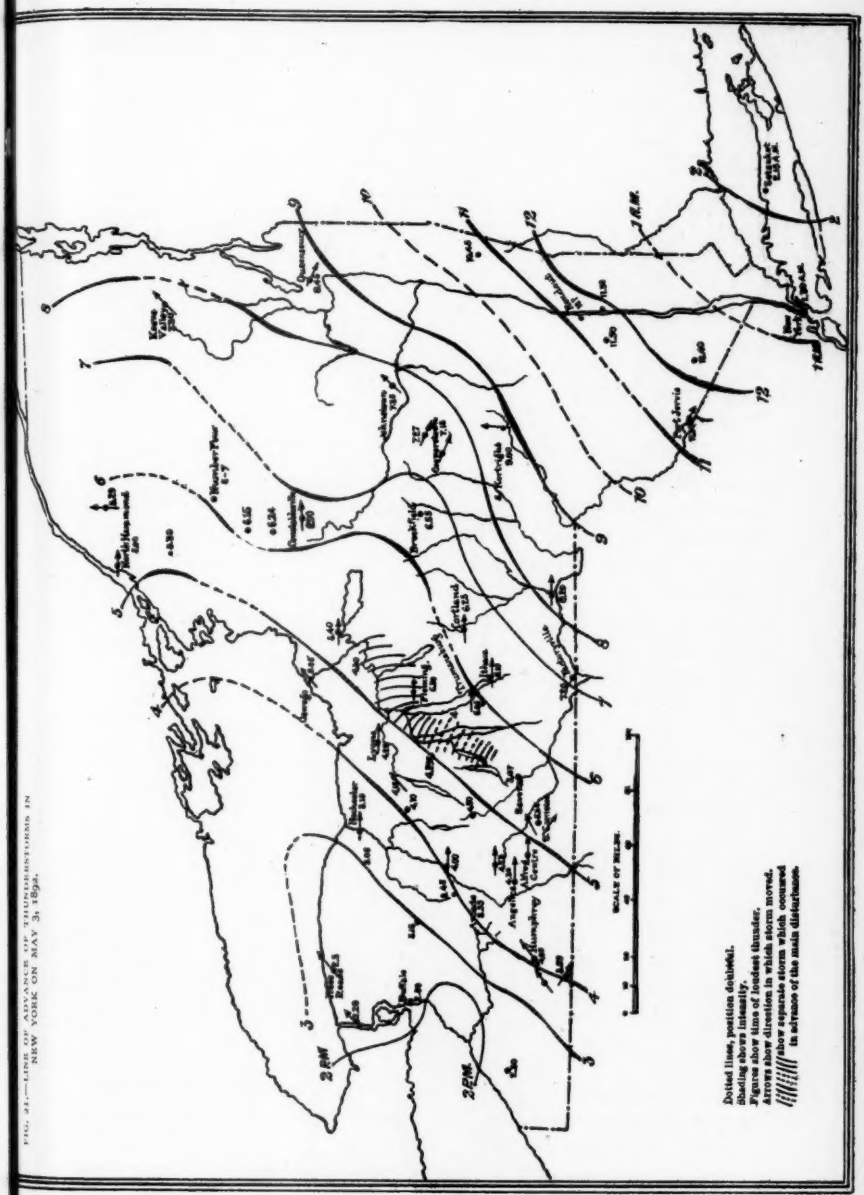

Dotted lines, position doubtful.
Shading shows intensity.
Figure above time of fastest thunder.
Arrows show direction in which storm moved.
Lines show separate storm which occurred in advance of the main disturbance.
SCALE OF MILES
2 PM
2 PM

FIG. 41.—LINE OF ADVANCE OF THUNDERSTORMS IN NEW YORK ON MAY 31, 1892.

PERCENTAGE OF RAINY DAYS.

STATION.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Total annual No.
Block Island, R. I.	47	44	39	35	38	32	36	29	29	35	39	41	135
New York City	39	39	38	37	34	35	36	32	31	31	34	36	131
Albany	45	43	44	40	40	41	39	31	34	35	43	44	146
Oswego	55	49	40	39	37	36	32	26	35	46	56	55	153
Rochester	65	58	57	42	38	39	37	32	38	47	53	61	171
Buffalo	59	55	55	41	39	39	35	31	38	46	55	59	170
Erie, Pa	65	58	57	44	39	41	33	32	41	51	57	65	178
Ithaca	59	54	46	37	46	40	43	37	37	40	46	50	161

Here it will be seen that the frequency of rain-(or snow-) fall is much more uniform over the State in summer than in winter, when the values are about 25 per cent. larger near the lakes than on the coast.

The probability of rain for all portions of the State may be fairly estimated from the averages at these stations, although some local variation must be expected, especially in summer, when local rains and thunderstorms are found to be quite unequally distributed over the State. It will be observed that precipitation occurs most frequently during the winter months at all stations; but, making allowance for this general tendency, the number of rainy days is found to follow, in a general way, the fluctuations of the rain curves shown in Figs. 17 and 18, which fact may aid in the estimation of rain probability for various special localities.

PERCENTAGE OF CLOUDINESS. (OVERCAST=100 PER CENT.)

STATION.	COUNTY.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Year.
Block Island, R. I.		55	48	51	45	51	40	43	44	47	49	51	56	47.5
New York City	New York	57	51	53	52	51	47	48	47	46	47	51	56	50.5
Liberty	Sullivan	62	62	60	57	49	47	44	45	43	52	66	66	54.0
Albany	Albany	60	57	61	58	52	48	48	50	50	58	60	70	56.0
Burlington, Vt.		57	58	64	53	56	44	46	40	51	70	61	72	56.0
Hamilton College	Oneida	76	74	65	56	48	43	38	36	39	57	75	79	57.0
Homer	Cortlandt	76	76	68	61	54	60	47	47	50	61	80	79	63.0
Elmira	Chemung	66	62	54	54	47	52	45	45	51	55	66	66	55.0
Geneva	Ontario	71	69	62	58	48	48	42	41	45	58	70	74	57.0
Oswego	Oswego	81	74	69	56	51	49	47	47	52	65	80	86	63.0
Rochester	Monroe	80	70	69	56	50	48	45	44	49	60	77	83	61.0
Buffalo	Erie	77	66	64	56	52	48	48	44	50	60	74	81	62.4
Erie, Pa		77	66	64	55	52	48	48	44	50	60	74	81	62.4

For our present purposes, the sources of cloud-formation may be included under two heads: 1st, low pressure, or storm, areas; and 2nd, local sources.

Low barometer areas usually bring with them a heavy cloud-

FIG. 22.—MAP OF THE STATE OF NEW YORK, SHOWING THE AVERAGE CLOUDINESS FOR THE YEAR.

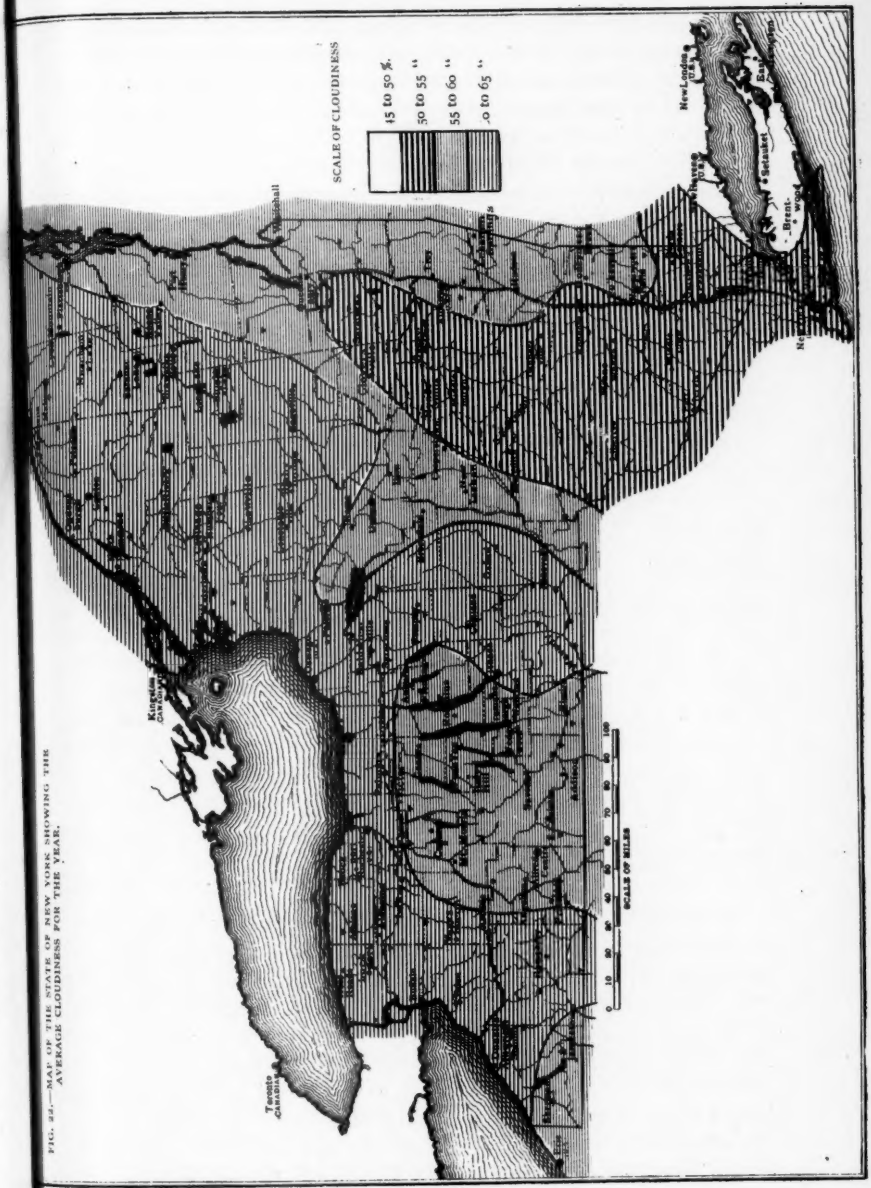


FIG. 22.—MAP OF THE STATE OF NEW YORK SHOWING THE AVERAGE CLOUDINESS FOR THE YEAR.

layer, many hundred of miles in extent; and since such disturbances pass in the vicinity of New York at intervals of three or four days during the winter, a large percentage of cloudy weather must be expected at that season, especially in northern and western New York, which sections lie nearer to the common track of storm centres than does the coast region. The lesser extent and frequency of low barometer areas during the summer months account in a large measure for the increased sunshine which then obtains.

The Great Lakes are the most important source of the *local* clouds, in winter. The vast quantities of vapor which rise from the lake surfaces are condensed by the prevailing cold northwesterly winds, and drift with them in a broad sheet over the greater part of western and central New York. Southeastern New York owes its clearer atmosphere to the fact that the prevailing winds carry the ocean vapors *away* from, and not toward, the coast.

In summer the prevailing southerly winds carry the lake vapors over Canada rather than New York; and also the high air temperature to a large degree prevents condensation and cloud-formation. Hence, during the warm months, fair weather prevails much more uniformly over the State than in winter.

The distribution of cloudiness over the State, for the year, is shown by the accompanying chart.

RELATIVE HUMIDITY. (PER CENT.)

STATION.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Year.
Block Island, R. I.	76	78	75	76	83	83	82	82	82	79	78	79	79
New York City	74	73	68	65	66	69	71	72	72	70	70	73	70
Oswego	74	74	73	68	67	70	71	71	71	71	71	76	71
Albany	75	74	71	63	62	66	67	68	72	72	74	76	70
Rochester	80	77	76	67	64	67	68	68	70	72	76	80	72
Buffalo	80	78	75	71	68	71	72	71	72	73	76	79	74
Erie, Pa	79	78	76	70	66	70	70	70	72	72	75	79	73

Although the *absolute* amount of moisture in the air is least during the winter, the percentage *relatively* to *saturation* (the relative humidity) is then generally at a maximum. At Block Island, however, the northerly winter winds have traversed a lesser expanse of water surface than the southerly or ocean winds of summer, and this circumstance, with the more moderate degrees of heat and cold to which the island is subject, reverses the rule applying to inland stations, causing the maximum humidity to occur during the summer. This is the case also along the south shore of New England and probably over the greater part of Long Island.

The maximum humidity at the Weather Bureau Stations within the State is found at Buffalo, which is subject to prevailing winds from the Lake. The region of least moisture, on the other hand, appears to be the Champlain Valley, as shown by a two years' record at Plattsburgh. The conditions are here very dissimilar to those of stations at the same latitude in the St. Lawrence Valley, the latter region showing substantially the same humidity which prevails near the Great Lakes.

The limits of this paper have rendered it necessary to consider climate as a fixed and definite entity, whose elements are represented by the averages of long series of observations. As a matter of fact, successive years may differ so widely in many or all of their characteristics as to bear little resemblance to the ideal which our averages represent. For example, the highest mean temperature on the records of New York City for January was 40°, which is the *normal* value for that month at Norfolk, Va.; while the coldest January at New York has the same average as the normal at Portland, Me. (20°). The fluctuations of other elements are quite as marked. Rainfall is especially variable, the annual total at Ithaca in one case, for instance, differing from the normal by 50 per cent.

To determine the extent and law of such fluctuations, an examination has been made of the records, which, in this State, extend back to 1826. As regards temperature, it is found that the coldest months of the year are the most variable, and that the variation may amount to 10° either above or below the normal, giving a range of 20°; but has not, so far, much exceeded that amount. In summer, the range of monthly means does not exceed 12°. We also find that deviations of 2° or 3° on either side of the normal occur about as frequently as a closer agreement with the normal; but beyond that limit warm or cold months are less frequent in proportion to their deviation from the normal. The normal has, then, a meaning and value as being approximately the *most probable value.*

The same rule holds in a measure also for precipitation; but the variations of this element are so wide that the formulation of any law becomes hazardous, and certainly is beyond the scope of this article. The rainfall in a single day may exceed that of an entire season, and, as already stated, the annual totals are subject to variations of over 50 per cent. If, however, we compute the total precipitation of the Januarys (say) of a long series of years at a given station, and then for a second period of like duration, the two will agree quite closely, and the more so as the length of the periods is increased.

The normals (which are simply these totals divided by the number of years of the record) thus serve an important purpose in bringing out the *characteristic* fluctuations of rainfall from month to month, and in different regions.

It is often asked, *Is our climate gradually changing?* To this question no perfectly definite and satisfactory answer can as yet be given; but we may at least assert that the changes, if any exist, are not sufficiently important to be readily discernible in the long records at our disposal. Only the broadest survey of climatological evidence can justify any conclusions in this matter, and for such a survey we must look to the work of Brückner in Germany.* This investigator has made use of all available records of weather, ice-formation and fluctuations of level in rivers and lakes, dates of harvest and other historical material, for the entire northern hemisphere. He concludes that relatively warm and dry periods alternate with cold and wet periods; the same phases recurring at intervals of about 35 years, or more accurately, as follows:

WARM AND DRY.	COLD AND WET.
1791–1805	1806–1820
1821–1833	1836–1850
1851–1870	1871–1885
(1886–1905)	.....

The cold years differ from the warm years by about 2°; and the dry years from the wet by about 20 per cent. of the total precipitation. These results have little value, however, excepting in their scientific aspect; for they show wide deviations from the data of a restricted region like our own, and furnish but little basis for local predictions. The progress of deforestation is also often said to be the cause of important changes in climate; but the most careful investigation of the subject has hitherto given only negative results.

* See "Modern Meteorology," by F. Waldo, Scribners.

THE PHILIPPINE ISLANDS AND THEIR PEOPLE.

AN ADDRESS BY

PRESIDENT JOHN G. SCHURMAN,

Of Cornell University.

Mr. President, Gentlemen of the Geographical Society :

I am under deep obligation to your president for the very generous remarks in which he has presented me to the audience, and grateful—if speakers are ever grateful to the audience—to see so large an audience here on such an exceedingly disagreeable evening. But the Philippine question is one which interests you, as it is interesting our people in general, and is likely, I think, to command interest for some years to come. It is true that one of the problems is practically solved. I mean the problem of military occupation, and, although not many months ago we were anxious to avoid military matters in the Philippine Islands, I think all fair-minded men, nay, I think men of all parties, must now recognize that the insurgent army, as an organized force, has been destroyed. I do not mean to say that there will not be some fighting in the future, but it will be guerrilla warfare. I do not mean to say that we shall not in the future see soldiers, but they will be mainly of the marauding or bandit type; and just in proportion as we occupy one important post after another and open up the country to trade and customs, even these marauding bands will disappear.

Consequently, there remains another question which, in my judgment, is a more difficult one, of vaster importance, and which will occupy our attention for the next several years; and that is the question of government. Now, as Burke said wisely, over a hundred years ago, the government of any people (which is as true of the Filipinos as it was of the people of the Thirteen Colonies) must be adapted to their character and their circumstances. I will, therefore, before I say a word about the government of the Philippine Islands, describe as briefly as I can the environment of the people and the inhabitants themselves.

I will ask you, in the first place, to note that our map-makers are responsible for a good deal of misapprehension in regard to the Philippine Islands. All maps of the United States and of this continent are made on a large scale. Maps of Asia are made on a small

scale, and the Philippine Islands when studied in our geography look like dots, unimportant dots, along the Asiatic coast. I want to impress upon you, to begin with, that this archipelago is of a wonderful extent. Put the northern part of the Philippine archipelago on the northern point of Scotland, and the southern portion of the archipelago, between the fourth and fifth degree north of the equator, will be on the toe of Italy. It is an archipelago of continental proportions. It stretches through seventeen degrees of latitude. At its broadest point, it covers some ten degrees of longitude. In shape it is a great triangle, with its apex at Formosa, and if from Formosa you draw two lines, making together an angle of about 60 degrees, and let the one next the Asiatic coast run down to about the centre of Borneo, and run your base from the centre of Borneo, you have a triangle which embraces and which has embraced all the Islands of the Philippine archipelago. Of these islands, it is calculated there are some 1,800, but the vast, the overwhelming majority of them are mere islets. The important inhabited islands you may count easily on the fingers of your hands.

But I have said this archipelago is a great triangle, lying along the coast of Asia, with its apex at Formosa. I want, with your permission now, to fill up this triangle with the more important islands before I go on to speak of the peoples of the archipelago themselves. The upper half, or third, pretty nearly the half of that triangle, is occupied by the largest of the islands, the Island of Luzon. It practically fills the upper third, or upper half even, of the triangle. It contains some 40,000 square miles. The area of the entire archipelago is about 120,000 square miles. The middle portion of the triangle is filled by a group of islands running in an easterly and westerly direction, and these islands are called the Visayan islands. Beginning next the Asiatic coast you would have, first, Panay, next, Negros, Cebú, Bohol, Samar, Leyte. These occupy and fill up the middle section of our triangle. The basal portion, the lower portion, the southerly portion of this vast triangle, is occupied by the Sulu archipelago and the great Island of Mindanao, almost as large as the Island of Luzon. Here, then, you have three distinct tiers: Luzon towards the apex, the Visayan islands towards the central portion and the Island of Mindanao in the southern portion of this great triangle.

The products of these islands consist, as you know, of hemp and rice and sugar and tobacco and cocoanut, these being the most important. Then, in smaller quantities, come the coffee, pepper and other products, which I will not stop to mention. Coal abounds in

different portions of the archipelago, not lignite, as I had supposed before going out there, but genuine coal, as the Commission was assured by owners of the mines in different parts of the archipelago. There is gold in different parts, notably in the island of Mindanao. The forests of the Philippine archipelago are among the most magnificent in the world. Such profusion and such variety it would be difficult to find anywhere else. Let me give you one illustration, which will bring out more clearly than any attempt at description what I mean by these great trees. When I was visiting the little town of Dumaguete, on the southern end of the Island of Negros, I met the municipal authorities and the authorities of the province, and we had an exceedingly interesting and pleasant time together, and, I suppose, to express their appreciation of the good time we had had together, when I came to leave they presented me with a round table eight feet in diameter, one piece of wood, polished like mahogany. It is a wood that is used all through the archipelago for cabinet work. I was, as you may imagine, very desirous of bringing home such a trophy, but I told them I was an American officer and could not accept a gift. You never saw people more surprised; they had not been used to anything of that kind.

Now, let me say a word about these people themselves. I think it is Matthew Arnold who complains of the monotony of our American life. Everything is the same; our cities are built alike; the streets cross each other at right angles; we even use the same letters or numbers to mark them. There is no distinctiveness about them. The country even is flat; the scenery is monotonous; politics is wearisome. Well, ladies and gentlemen, we shall have variety enough in our politics in the future. We have in the Philippine Islands alone (and that is but one of our new possessions) 84 different peoples, or, at any rate, 84 different languages or marked dialects. The total population is about 8,000,000. Of these, roughly speaking, a million and a half are uncivilized; they are barbarians or savages. The rest are civilized and Christianized.

Taking the people as a whole, they divide themselves into three great races. By far the most important is the Malayan race. The great majority of all the inhabitants, civilized and uncivilized, are of the Malayan race; but before I mention them I shall mention two others, which, with the Malayan race, constitute, as I have said, the entire population. First of all you have the Negritos. They appear to be the primitive inhabitants of the archipelago, indigenous people, who were driven to the mountains by the invaders, much as the Celts in Britain were driven to the fastnesses and

wilds of the remote mountains of Scotland. They have rapidly disappeared, and within recent times and recent years islands were known in which they have passed out of existence. It is estimated that there are still some 25,000 of them alive. They occupy the mountain peaks of the Island of Luzon away up north, the mountain peaks of Panay and Negros in the middle tier, and the minor peaks of the great island of Mindanao in the south. They live on tubers, roots and fruit and such game as they can bring down with their poisoned arrows, wandering about naked or almost naked in the woods. Physically and intellectually, they are the lowest people in the archipelago. They have curly hair, flat noses, thick lips, big, clumsy feet, and they are low of stature. These are going. In a generation, or a few generations, they will have disappeared. We should have heard nothing about them in recent years but for the enterprise, I suspect, of the newspaper men, who found them an interesting subject for description. Probably no newspaper man had ever seen anything of them, and I have always supposed that that contingent of them which was said to have joined Aguinaldo's army was a perfect myth.

In the second place, you have a race entirely distinct from the Negritos, who are called the Indonesians. They are found only in the great island of Mindanao, to the south. They are a very remarkable people, although numerically weak in comparison with the Malayans. Naturally no accurate census has ever been secured. An estimated figure is from one-quarter of a million to half a million of Indonesians. They are a fine-looking race of men. The Negritos are low of stature; the Indonesians are tall. They have waving hair, aquiline noses, well-moulded lips, fine muscle and limbs, perfect athletes, reminding one rather of Greeks than of modern savages or barbarians. I remember a very interesting conversation I had with one of them near Zamboanga, on the island of Mindanao, in June last, and I could not repress my admiration for the fellow all through the conversation. It seemed to me that if he was in this country he would be just the man that our great universities would be competing for as a foot-ball player.

Unfortunately, the Indonesians have no education, no intellectual opportunities of any kind, and consequently, however great their inherent aptitudes may be, there has been no development of them. Where their neighbors were warlike, they have become warlike; where their neighbors are peaceful, they are peaceful and docile.

Of the three races I have mentioned, by far the most important and

the strongest of all are the Malayans. They number over 7,000,000 of people, civilized and uncivilized. In appearance they are darker than the Indonesians, brown of color, of course, but not so dark as the Negritos; and while they have not the curly hair—for their hair is straight—they have in many instances, the flat nose and the thick lips of the Negrito. But they are an abler people, they are a more intellectual people, as you can see by looking at them, or better, by having intercourse with the educated specimens that the race has turned out. These people, it is said, came into the archipelago centuries ago from the south and drove out the other inhabitants, and drove them to the mountain fastnesses. They have not remained a pure race. They have mixed with the Chinese, the Indonesians, the Negritos, and to some inconsiderable extent with the Spaniards, so that all over the archipelago you see striking evidences of this mixture of races.

Now, these three races constitute, as I have said, the entire population of the archipelago, a population which uses 84 different languages or dialects. But although that is true, over six millions, perhaps six and a half millions of these people can be assigned to seven different tribes, speaking only seven distinct languages. Of these, there are six in the island of Luzon alone. About Manila, the provinces to the north and south and west of Manila, you have the Tagalos, numbering 1,600,000 people. They are the people who began this insurrection, first against Spain, and then continued it against ourselves. The Tagalos are the most advanced of all the tribes in the archipelago, not, I believe, because they are abler than the other tribes, but because, living as they do about Manila, they have felt as no other tribe could feel the influences of European civilization. To the south of the Tagalos, and occupying all the remaining southern portion of the island of Luzon, you have a tribe called the Vicoles, numbering nearly half a million of people. They are entirely distinct from the Tagalos, using a language which these cannot understand.

North of the Tagalos and occupying the central portion of the island of Luzon, you have the Igorrotes, 365,000 of them, and the Tinguianes, 340,000 of them, each again with a distinct language different from one another and different from all the other languages of the archipelago.

And finally, to the north of Luzon, on the side of the China Sea, you have the Busaos, who number between four and five hundred thousand people. And then, on the other side, on the Pacific Ocean side, in the valley of the great Cagayan, where the

best tobacco in the world is raised, you have the Calaúas, numbering nearly 200,000.

Here are six different tribes, speaking different languages, unintelligible to one another, in the island of Luzon, each tribe having its own peculiar manners and customs, though I must admit, through Spanish influence, a good deal that was peculiar and many discrepancies of the tribes have been rubbed off.

Now, in addition to these six different tribes in the island of Luzon, you have this middle belt of islands, called the Visayan Islands, inhabited by another tribe, the Visayan tribe, with two distinct dialects—one the dialect of Cebú, the other the dialect of Panay. The Visayans who occupy these islands constitute the largest tribe in the archipelago. They number 2,600,000, and while they have not made as considerable advances as the Tagalos (who were, as I said before, the tribe that fought us), I think it is due rather to the distance from Manila, to the absence of European influence, than to any lack of ability in the people themselves. I saw them in several of the islands. I held intercourse with them in Panay, and elsewhere, and they impressed me in comparison as more solid than the Tagalos, not so volatile and excitable. If a comparison were to be made between them and the people of Europe, it would undoubtedly be as between the French and Germans. The Visayans are undoubtedly slower than the Tagalos, but, I say, they are solider, and while they may not have as lively imaginations, they have far better judgment. When that European influence which has done so much to civilize and elevate the Tagalos makes itself more strongly felt in Iloilo and Cebú, very much may be expected from them; in my judgment, more than from any other tribe of the archipelago.

And lastly, in this southern tier of the Sulu archipelago, you have, in Mindanao, the Mohammedans, between two and three hundred thousand of them, and then in the interior of Mindanao, away from the coasts, which alone were known to the Spaniards, you have barbarians and savages, tribes innumerable.

So much of the habitat; so much of the people of the Philippine Islands.

If, now, you ask me about that civilization I referred to a little while ago, I shall have to say at once it is a civilization, not of the highest type, but of the lower type. It was in 1521 when Magellan landed in Mindanao and then sailed up to the south of Cebú. He was accompanied by the missionary. The King and his followers were immediately baptized. In a few days they engaged in war with a

little tribe of another island, Mactan, a few miles across from the south of Cebú. Magellan, of course, sided with and led the Cebúans. He himself was killed in that conflict and buried in the Island of Mactan. It was 50 years after that before the Spaniards undertook to make their occupation of the archipelago effective, and in about 1574 Legaspi went out, landed at Cebú, where the people had relapsed into savagery and renounced their allegiance to Spain, won them over and took the city of Manila and extended Spain's authority through the island of Luzon. He died there the next year. Magellan and Legaspi are the two great names in the Spanish political history of the Philippine Islands. They were accompanied, however, on the visit by the missionaries and the Catholic priest, and these have been the great civilizing influence from the beginning of the 16th century to the present day in the Philippine archipelago. Whatever civilization they possess they owe, I will not say exclusively, but largely, to this source. If in recent years troubles arose (and they have arisen) between the Filipinos and the Orders, which in other days brought them their civilization and all the blessings of civilization, we ought not on that account to forget, nor ought the Filipinos to forget, the debt of gratitude which they owe to the Spanish priest and missionary.

I do not mean to say that the civilization which you find there now is to be compared with the civilization of any foreign country, even Spain. Far from it; and without going into details, I can best illustrate the civilization of the archipelago by describing what I saw in some typical town or pueblo. That might enable you to realize better than any general description. Of course, one could not for such a purpose take Manila, because Manila with 300,000 people is a great cosmopolitan town. There are forty to fifty thousand Chinese; though a number of Europeans and Americans can be counted, there are very few of them; of Spanish half-breeds there are thousands. It would not be fair to take the city of Manila as illustrating the social, economic and intellectual condition of the people. But suppose one went to some town in the Island of Luzon at some distance from Manila, or to a small town in one of the southern islands; there you would have a typical body of Filipino civilization before you.

I remember landing from the *Bennington* (which was at my service for a trip of two thousand miles which I made from Manila) one afternoon in the old town of Silay, in the northern part of the island of Negros. Let me tell you what I saw there. We landed in a body on the rude boat. There was a narrow tramway there

and a freight car on it of a very primitive type. Chairs had been set in this car, and we were asked to take our seats. A water buffalo was attached to this car. The carabao, or water buffalo, you can find everywhere in the Philippine Islands. You can scarcely think of the Philippine Islands without thinking of buffaloes, as you think of the bamboo tree, which they use for almost all purposes. The water buffalo was attached to the car. In a little while we were ready to move. I saw on the back of the buffalo a little Filipino boy, clad in the simplicity of nature, with a cigarette in his mouth. You scarcely ever see a Filipino man, woman or child without a cigarette. The procession moved on through the town. Crowds of people stood on each side, dressed in that Filipino garb which has now become familiar to you through all our illustrated magazines. We passed by them and by rows of huts, built entirely of bamboo, with floors of bamboo. The roof is made of cogon grass or of leaves of the nipa palm, which grows in the Province of Pampanga, north of Manila. Through rows of houses we passed until we came to what might be called the west end of the town. Here were several houses and a church. You find in all these pueblos a fine church. It is either a frame building or, as in most cases, a stone building with thick walls. And that will explain, by the way, why the churches were so frequently occupied by both armies during the recent conflict in the Philippine Islands. The church is the one building available for the purpose in any pueblo to which you go.

We were taken first to one of those buildings which would remind you of a small building in southern Europe, in Spain or Italy. I met there a number of fine, educated, well-bred Filipino gentlemen and half-breeds, one of them an artist who had painted (and I had seen the picture before going up) two or three portraits of Filipino martyrs. They have their martyrs already, and besides painting these he had painted a fine picture of Liberty, which was hanging in their Hall of Congress; the American eagle had gnawed in pieces the chains which bound the Filipino, and was now holding them out. I found him and others educated, intelligent, refined Filipinos. Spanish is the language which all these educated Filipinos can use and do use. We talked together for half an hour or an hour, and then were invited to another house to dinner. I am sure you would be surprised at the number of courses and the variety of wines. The food was different from ours, but in its way excellent. The wines were European wines, such as you would get in Spain or in the south of Europe. After dinner came

the speeches. They have their intellectual repast with meals as we do at our banquets. There was no professional fun-maker. The speeches were all serious and all admirable. I very well remember how, when I told them, in such Spanish as I could command for the purpose, what the object of the United States was; how we were there to liberate them, and to give them all the political liberty they were capable of exercising; I remember how the roof of that hall rang and rang again with the plaudits of the people, and an old man, who could not speak Spanish, an uneducated man, got up, and in his native speech thanked me with tears in his eyes for what I had said. One gentleman, who spoke Spanish, got up and put it into Spanish. That was the second frame house I had visited, and my ideas of them rose as we went along.

I was now coming to the third, and it was prepared for the inevitable dance which follows all banquets and closes all forms of entertainment in the Philippine archipelago. The people are fond of entertainment; they will dance at all hours of the night. The ladies, who are fond of dress, came out bespangled with jewels and diamonds, not such as you find on Fifth Avenue, but the diamonds were there, and they made a creditable show; and with the gracious manners which Filipino girls display, one could not but feel admiration for such a spectacle as I saw that evening. I was so charmed I staid until three or four o'clock in the morning, but the festivity seemed to have just begun when I went out to join my associates. I mention that as a picture of life found in the pueblos, or towns of the Philippine Islands, of the civilized portion.

Now, without saying any more about their civilization, insisting that you shall take this picture as an illustration of what you will find among the six and a half millions of civilized people, I will turn to another question, and ask why people who have been nurtured as these had been for over three centuries by Spain, should, in the year 1896, have revolted? I am describing the Philippine Islands and their people and circumstances as I found them. For the revolt began in 1896, and while I am endeavoring to pay the compliment to Spain for the Christianizing and civilizing influence in the Philippine Islands, truth also requires that I say that Spain retained in her administration of Philippine affairs a form of government which might have been serviceable, which might have worked well thirty or forty years ago, and which the Philippine peoples under her own tutelage had outgrown. They were fit for better things. She had in part trained them up to better things, and yet she had never prepared them for a change.

What, now, were the causes of that insurrection? They were partly religious and partly political. Now you all know, ladies and gentlemen, that there is nothing more dangerous to speak of, or nothing more embarrassing to speak of, in a general audience than the subject of religion, and I don't want to speak of it at all; yet I must describe facts as they exist in the Philippine archipelago, and so if you ask me what led to the insurrection, I think I had better read the programme of the insurrectionists themselves. You will see from that programme what the causes of the uprising were. I have before me the first volume of the report of the Philippine Commission, of which I had the honor of being a member. That report has not yet been made public. This is a private copy. Congress is making an appropriation for printing 15,000 copies, and when that goes through, I suppose it will be put on the market. On page 84 of that report, I have inserted a programme which appeared in a Manila newspaper in the year 1897, after the insurrection had been in operation a year. They explained their demands in that programme, and it shows as clearly as can be put in words what the causes of the insurrection were. Let me now read it to you:

"1. Expulsion of the Friars and restitution to the townships of lands which the Friars have appropriated, dividing the incumbencies held by them, as well as the Episcopal Sees, equally between the peninsular and insular priests." (*Peninsular*, Spanish; and *insular*, Filipinos.)

"2. Spain must concede to us parliamentary representation, toleration of all religious sects, and administrative and economic autonomy.

"3. Equality in terms of pay as between Spanish and Filipino civil servants.

"4. Restitution of all lands appropriated by the Friars to the townships, or to the original owners, or in default of finding such owners, the State is to put them up at public auction in small lots of a value within the reach of all and payable within four years, the same as the present State lands.

"5. Abolition of the government's power to banish citizens, as well as unjust measures against the Filipinos. Local equalities for all. * * *."

Now, ladies and gentlemen, it is perfectly clear from that programme what the moving causes of the insurrection were. I have often heard it said that the Filipinos are fighting for independence, and I hear it charged against our own Government that we are resisting their legitimate aspirations for independence. I beg to call your attention to the fact that in the programme which I have just read the word "independence" is never mentioned, and the conception of independence is absolutely wanting. They are going to remain under the ægis of Spanish authority. They desire only those inalienable rights which men of all colors and all creeds are entitled to, by virtue of their humanity as such. It is not a dec-

laration of independence, as so many of our people have supposed. It is a calm, deliberate exposition of grievances, a demand for redress, a declaration in the nature of a Magna Charta; that, and nothing more. And if you ask me what the remedy is, I reply that I know no other remedy than the old American remedy—religious liberty, civil rights, and all the political franchises the people are capable of exercising. Give them those and their aspirations will be satisfied. Give them those—they attain the objects for which they made war on Spain.

Nor has the lapse of time since 1897 made any change in this programme, so far as the masses of the people are concerned. When I came back from the Philippine Islands a few months ago and made that statement and asserted that the people were not fighting for their independence, I was somewhat surprised to find myself—and I was engaged in trying to find the truth and was then reporting it as I saw it—I was surprised to find myself described as one who was supporting the Administration at any cost. I was after the truth and I reported the truth as, after diligent investigation, I found it. That programme confirms my report. But if further confirmation were needed, I have received it this week from a most unexpected source. You all read the *Evening Post.* You know that on this business and on some other matters it does not support the Administration. But the *Evening Post* has in Manila one of the ablest, if not the very ablest reporter who has been sent from the United States. In a letter which was published in the *Evening Post* of Friday, March 16th, a letter dated "Manila, February 2nd"—and it is very creditable of the *Evening Post* to publish letters of this kind, which refute its own editorials—in the letter of last Friday, in the *Evening Post,* I was delighted to find the following confirmation of the views which I have maintained ever since I came home, and have just presented to you; namely, these facts: that the Filipinos did not want independence, that they were not fighting for independence; they were resisting wrongs and abuses and amply admitting that these reforms could be given them easily enough without raising for a moment the question of independence; while Mr. Robinson, this able correspondent, says, referring to the questions which remain unsettled:

> "They are quite open to immediate settlement at any time along strictly American lines, political freedom and religious freedom. Political freedom does not necessarily mean absolute political independence. The best information that I get assures me that this is not demanded and is not really wanted."

I hope now, in view of this report by the correspondent of a paper

which sympathizes so fully with the anti-imperialists, that our report—a report which we have been making for some months past—will receive the credence to which I assure you it is entitled.

Here, then, is the situation of affairs we find in the island. And now, what of the remedy? I have been saying for months, and you will notice that Mr. Robinson repeats the same in his article which I read, that the remedy is undoubtedly to be found along the American lines of religious freedom and civil rights and of political freedom.

Now, so far as the first point is concerned, I do not choose to dwell upon it. I will simply say that, in our proclamation, issued upon the authority of the President, we stated that hereafter religious freedom should be guaranteed in the Philippine Islands, with the equality of all denominations before the law and the separation of Church and State. And undoubtedly large results from this initial reform will follow from the operation of that simple principle alone.

There is another matter which is, perhaps, almost as difficult to deal with, and that is the question of the property held by the religious corporations or Friars. The Filipinos, in the programme which I have read to you, proposed to confiscate that property. The holdings are enormous. In some provinces about Manila the religious Orders are said to hold about one-half of the entire country, and the feeling towards them is naturally about the same as that which in Ireland the peasants used to feel against the absentee landlord. You will observe in this programme the proposal is to confiscate these lands, and I may say that in the constitution of the so-called Philippine Republic it is also provided that these holdings of the religious Orders shall be confiscated, although the phrase there is an exceedingly happy one; it is euphemistic even. It says that the property "shall revert to the State," but the result is the same, so far as the Orders are concerned.

I do not believe in such a policy, ladies and gentlemen. I think it would be unjust, and the United States is estopped from following such a policy, even if the American people desire it, as I do not believe they do. We are estopped, I say, from pursuing such a policy, because the treaty of Paris specifically provided that all property rights in the Philippine Islands should be respected. You must, therefore, find some other solution of this question. Either the religious Orders must remain as they are, in possession of their vast estates, the masses of the people objecting to them and feeling towards them the opposition and resentment which led them to rise

in rebellion in 1896, or the State must buy up the lands at an equitable valuation—and my own recommendation is that this latter course be adopted. Let a court be established in the Philippine Islands for the purpose of determining the value of the lands held by the religious Orders, as Mr. Gladstone established a court in Ireland for the purpose of determining equitable rent, and let the State buy the lands at the valuations appraised by the court. The State could afterward sell them out in small holdings, as, you observe, was suggested in the programme of reform which I read to you; and even if the State lost a little money by the transaction (the Filipino State), it could afford to lose it for the sake of settling a question so difficult, so embarrassing and of such enormous proportions. If the State did incur a debt in buying them up, there is this satisfaction, the Filipino State owns, or will own, a great deal of land—crown land. Those lands are now mostly in the interior, either in the mountain district, or far in the interior, where communications are impossible.

One of the first things we shall do in the archipelago is to build roads. I believe in schools, but roads must come first. Intercourse, and the possibilities for intercourse, are the means of civilization. A most potent means they are. As we build roads and railroads these public lands will be made accessible, and become, in many instances, exceedingly valuable; and if the State created a debt in settling the question of the holdings of the religious corporations, it would have enough, and far more than enough, to recoup itself, in the reserved public lands, when once the country has been opened up. That is my settlement of the religious question in both its phases.

Let me now pass to the other question which was raised in the programme. I have read the questions of political reform. Here, too, I see nothing better, as I have said before, than the good old American way of civil and political rights. You must give these Filipinos their civil rights. We do not want, as Spain did, to return to the arbitrary power to banish the Filipinos from the islands, on mere suspicion and without trial. We want there nothing but justice and right and the spirit of the ancient law, which has shaped the civilization of Europe and America. Give them that; do away with your military government, as soon as possible, and let the reign of law take its place, and the Filipino will be vastly more satisfied than he has ever been since you entered his archipelago.

And then, as to political franchises, what shall we say? I, for one, do not say independence. I do not say it, first, because the

Filipinos do not want it. They say it is impracticable; and, secondly, because I see and know (and no man can go to the Philippine Islands and travel there much without becoming convinced) that they are absolutely incapable of maintaining or existing as an independent sovereign State. If you granted the Filipinos independence to-morrow you would first have to find some organization to grant it to. For the little government of the Tagalos is not now a government in being, but a government "in motion." But if you found, by hunting carefully, some organization to entrust absolute independence to, in the short course of a year or so one of two results would follow. It is highly probable this would follow: the different tribes would fall out among themselves, and, falling out among themselves, produce chaos. Or, if they did not do that, this other result is pretty sure to follow, that some lone settler in Panay or Iloilo, or Cebú or some other part of the archipelago would find his life in danger some day, or his property destroyed. He would ask his own Government to intervene to protect him. But the moment a great European Power intervenes to protect life or property you know what happens. The archipelago would inevitably be divided up among the great nations of Europe and Japan, and the dream of a united, free Filipino commonwealth, which animates the minds and hearts of the best Filipinos to-day, would disappear forever. The best hope of the most ambitious Filipino patriots is to-day in the American Republic. They see that under us they have a chance, or may have a chance, for the future; apart from us they have absolutely none. If, then, these people are not to have independence, what kind of government should we give them?

I made out a plan, and the Commission, I may say, delegated to me the question of government, and from the time I was in the Philippine Islands till I left I was trying to find out what the Filipino people wanted. There are various ways of doing that. You may find it out by conversation with Filipinos in different parts of the archipelago, and I went all over the archipelago and met educated men and prominent owners and discussed it with them. You may find it out in programmes of reform like the one issued in 1897, and by reading different books and pamphlets which appeared in recent years; and this information, we think, we have patiently used, and as a result we think we have recommended to the President a form of government which the Filipinos themselves desire. You, yourselves, can be the judges when the report of our Commission appears, for we have published along with the report, in the appendix

as exhibits, a number of these books which serve as a basis for our own recommendations.

Many of the features of the government we recommend we take from the Constitution of the so-called "Philippine Republic." Some of the other features we take from a Constitution drafted by the people themselves. Some of the other features we took from a Constitution which we had prepared specifically for the Commission by the ablest Filipinos in the archipelago, and there is scarcely a detail of the form of government we recommend which is not borrowed from the Filipinos themselves. In brief, the plan is this: let the President of the United States name a Governor for the Philippine Islands. Let that Governor have a cabinet, consisting of Americans, or Filipinos, or both. Let the judicial department have at its head a Supreme Tribunal, consisting of Americans and Filipinos. Let the legislative department consist of two branches—an upper house or Senate, and a lower house, or House of Representatives. Let the House of Representatives be elected by the people, and the upper house half elected by the people and half nominated or appointed by the President of the United States. If this latter feature strikes you as peculiar, I may call your attention to the fact that the Filipinos themselves suggested it, and in the ablest memorandum submitted to us that very feature was embodied.

Do you think that people enjoying a political organization of that kind are not in possession of liberties, are not enjoying pretty tolerably full political franchises? Then I remind you that that government is more liberal than the form of government that Jefferson himself outlined for the people of Louisiana, for in Jefferson's scheme of government, which went into effect in 1804, both houses of the legislature were nominated by the President.

Now, in addition to this General Government, convening at Manila, we propose that the different provinces—and there are over sixty military provinces—shall be turned into counties with self-governing councils, and the towns and cities of the archipelago shall have municipal councils, also self-governing. That reminds me of the political organization of the State of New York and New Mexico. But now there comes a difference. We think of our towns as independent of their central government. The government of Albany is supposed not to be interfering with the government of the city of New York, or the city of Syracuse. We have what we call "home rule," and in theory we assert it, and generally maintain it in practice.

Such a conception of local government is unknown to the Fili-

pinos. We all have our ideas and notions determined by experience. The only government they have experienced is Spanish. In Spanish government, the principle of centralization prevailed and all municipal councils were dominated by the central Government at Manila. They, therefore, looked for intervention, regulation, control from Manila, as a part of government. They cannot conceive a county or town government without supreme control on the part of a central government at Manila, and in the different programmes of government submitted to us this element was incorporated. I was perfectly amazed when I met it first; it was what the people themselves desired. But I said to myself, "If they desire it, they shall have it, so far as our recommendation is concerned," and we made that recommendation, and I can see that something like that is absolutely indispensable, because you must have an American official for every 250,000 people or so to give them the benefit of American experience and supervise closely the collection of revenues and expenditure of revenues, for that is the point in which most Oriental peoples are deplorably weak and need special watching.

For the others down in the archipelago, and Mindanao, we recommend a different form of government. Among the six and a half millions of civilized people, with whom we have been lingering, there is not a chieftain, not a sultan nor a ruler of any kind. It is a sheer democracy. There is no leader of any sort, except the educated man. Down in Sulu and Mindanao, the conditions are different. There are sultans and chieftains, hereditary rulers whom the people respect and reverence. They control as well as govern the people. Consequently, if you wish to establish law and order and maintain government in the southern tier, you simply must make agreements with these chiefs. I saw on my first visit as an American official the sultan of Sulu and I suggested an agreement similar to the agreement made between him and Spain, and he was willing to accept it. Long after, I sent my telegram to Washington recommending that that policy be adopted for all that southern tier, and it has been put in operation, and we now have all that southern country without the flash of a sword, or the shot of a single gun.

Here, then, ladies and gentlemen, are the two different schemes which you must put in operation in the Philippine Islands, in accordance with the diverse conditions of the inhabitants.

I can only say in conclusion that I believe, if this scheme of government is put in operation—and the President is sending out

another Commission, headed by Judge Taft, to put this scheme in operation—I believe, if it is put in operation, the people will be contented. Although the problem of government in the Philippine Islands is by no means easy, I do not believe it is as hard a problem as the majority of people have supposed. There are three or four hopeful circumstances. The people, though densely ignorant and superstitious in the extreme, long for knowledge. The idea of Japan is constantly before their minds, and they think, as Japan has become a great people in the course of a generation, something of the same kind is possible for the Filipinos, if they can only get education. Second, everywhere I was astonished to find the perfect harmony which existed between our every-day practice and traditions and the ideals and aspirations of the Filipinos. Why, ladies and gentlemen, the things that we would do and naturally give them are the things they are longing and yearning for. Everywhere you go you find a small number of educated men, not many, very small in proportion to the entire population, but an element; for, in my way of thinking, these educated men are a connecting circumstance; they are capable of swinging the masses; the masses will follow them.

It is our duty, therefore, to decide this question right. How are we to do it? By satisfying their legitimate demands. We set ourselves deliberately, from the time we landed there until we left, to find out what those people wanted, and the results of our inquiry are embodied in this report, and it is because the President has adopted that report and is sending out a Commission to put it in operation, and because our recommendations will satisfy these educated men, that I feel such confidence in the future of the archipelago. Only one danger I see ahead. That danger is not in the Philippines; it is in Washington. If we apply to the administration of public affairs in the Philippine Islands the same sort of civil service notions that guide us in our domestic administration, we shall fail. And our failure will be more inglorious than Spain's, because the Republic falls from a greater altitude. It is absolutely essential to success in the Philippine Islands that you send out the ablest men you have; that you give them permanent appointments; that you promote them for merit. It is absolutely essential that such men going out must at the beginning, just as the English officials do, learn the languages of the natives so as to understand them, sympathize with them, and understand matters from their point of view. We cannot govern the Filipinos from our point of view, or from our notions; we must take their point of view, and

in order to understand them, we must know their language, so that we may be free from the aid and the misguidance of interpreters, and can hold ready intercourse with the people themselves. I may point out that I have heard from among the leaders in both parties that such a special permanent Filipino reform service must be established. I take encouragement from these assurances; and if they are carried out, then I have no doubt whatever that by the same common sense and conscientiousness and integrity by which we have governed this Republic as it has extended from Plymouth Rock to the Pacific Ocean, we shall also govern with success and credit our new possessions in the Orient.

PELOPONNESIAN JOURNEYS.

BY

CLARENCE H. YOUNG.

Greece is, probably for the majority of persons who have never visited that land, merely a country of the past, rich in associations and interesting because of the part it once played in the development of the world's history, but at the present day reserved for the shovel and the pick of the archæologist and for the researches of classical scholars. Yet, entirely apart from its ruins, modern Greece and its inhabitants offer to the traveller, who finds enjoyment in the picturesque in Nature and entertainment in the study of the life and customs of a simple folk, much that is of interest.

The most prominent natural features of the country are the numerous bays and gulfs which, broken by many headlands and occasionally dotted with islands, set far into the land, and the mountains which cover its surface in a perfect network. There is not, it is true, in Greece any single peak that attains a very great altitude; but, on the other hand, the number that reach a goodly elevation is unusually large, and this conspicuous magnitude of the many peaks forms the most characteristic feature of the Greek landscape. Almost equally striking, however, are the clear-cut outlines of the mountains, which are due in part to the hard limestone formation, in part to the absence of vegetation. For, in the course of the centuries, the forests have in large measure been destroyed, though even now in some districts considerable stretches of woodland are to be found, and with the passing of the trees the rainfall has decreased, so that during the summer months, when hardly a shower comes to moisten the parched earth, the country is for the most part extremely arid. But though we miss in Greece the cultivated prettiness of England and the grandeur of the Alpine scenery of Switzerland, its mountains, with their bold outlines sharply defined against the sky in that wondrously clear atmosphere, have a rugged beauty all their own; the skies above are as bright, as warm and as cloudless as those of Italy; the waters that wash its shores are clearer and bluer, were that possible, than those of the Bay of Naples; while on the hillsides there is an ever-shifting play of shadows, varying in hue from gray to black, from grayish blue to deepest purple, which adds not a little to the beauty of the

scene. To complete the picture we must add the dusky grayish green leaves of the olives with their gnarled stumps, the darker green of the vineyards, and in the early spring, when the foot-hills are covered with green shrubs and the plains are bright with the young shoots of the grain, the numerous wild flowers, the iris, the cyclamen, anemones, orchids, gorgeous red poppies, the lovely clustering yellow flowers of the gorse and countless other varieties, which in many places grow in such profusion that it is impossible to take a step without trampling their delicate blossoms under foot. There is probably, I think, no other country in Europe where the beauty of the scenery is so largely dependent upon the exquisite coloring of Nature, and, consequently, none of which a photograph or a lantern-slide gives so imperfect an idea.

But for me, personally, the greatest charm of modern Greece lies in the fact that it is as yet unspoilt by civilization and by the influx of sightseers that have overrun the rest of Europe. Here is a land where everything is not arranged to attract the tourist, and where the people are, for the most part, still content to live the same simple lives as their fathers before them. The atmosphere is that of the Orient, where time has not yet become so precious as in this bustling Western world, and where men still transact their business in a leisurely fashion, which we are unable, or unwilling, to follow even in our pleasures. In Greece, moreover, the railroads are not so old nor so extended as to have caused the people to forget that space exists, and the man who prefers to jog slowly along on the back of his mule or donkey, instead of being whirled to his destination in a train, is not regarded as an anomaly. As to hotel accommodations, those of Athens are excellent; those of the other large towns are, at the best, passable; while elsewhere the traveller is dependent upon the μαγαζεῖον (*magazeíon*) or village store, or else upon private hospitality, for shelter and for entertainment. All this has, of course, its drawbacks, and the traveller in the interior of Greece must be prepared to forego not only all luxuries, but not infrequently, even many of the ordinary conveniences of life. Most of the positive discomforts can, it is true, be avoided by travelling with a dragoman or courier; but the wise man, who possesses even a slight knowledge of Greek, will content himself with the services of an ἀγωγιάτης (*agogidtes*), as the man is called from whom one hires his saddle beast and who accompanies one to take charge of it. By so doing the traveller is brought into closer touch with the people and sees more of their life and customs; while the *agogidtes* is generally a good guide

within a radius of several days' journey from his own home, and, though quite ready to cheat you in the bargain which you make with him, will, when once hired, almost invariably look sharply after your interests, and in case of a dispute will side with you even against his own countryman.

As for the Greeks themselves, they are an interesting nation, and with all their faults—and these are by no means so black as popularly painted—I found them extremely lovable. Dirty many of them unquestionably are, but it is, as a rule, clean dirt, by which I mean that it is the dirt of the fields. As for the fleas and other vermin, with which the majority of the peasants' houses are infested, their presence is not due solely to filth, for the natural conditions in Greece appear to be peculiarly favorable to their propagation; and, as I have been informed by both educated Greeks and resident foreigners, the only way in which a house can be kept free from these pests is by an unceasing vigilance and an almost endless housecleaning, for which the ordinary peasant cannot find the time. That the Greek occasionally deviates from the truth may be a fact; that he is the inveterate liar which he is often represented as being I do not believe, for the number of instances that came to my notice in which a lie of any kind was told was very inconsiderable. Similarly, as regards the charge of dishonesty which we so often hear brought against them, my own experience would lead me to form quite the opposite opinion, for during the entire ten months that I spent among them I never had a thing of any kind stolen. One criticism, however, that can very justly be laid at their door, if we judge by our own standards, is that of unscrupulousness and of cheating in business transactions; but here the fault lies not so much with the individual as with the standard and the customs of the country. The transaction of business upon a basis of fixed prices is practically unknown in Greece, and, since bargaining is always expected, the seller invariably asks much more than the sum that he expects, and is willing, to take. And if you will only meet him on his own ground and fight him with his own weapons until you have compelled him to accept a fair price, he will not only be perfectly content but will also feel far more respect for you than he would had you verified the old adage, "A fool and his money are soon parted," by paying him the price first asked. But once this necessary preliminary had been gone through with and the bargain made, I found that they could generally be depended upon to carry out the terms of their contract. Yet, combined with business sagacity and shrewdness of a high order, you often find an ingenu-

ousness and simplicity which charms and attracts one by its very childishness. And like a child, too, the Greek is eager, impetuous, keenly susceptible to emotion, easily swayed by the impulse of the moment, and quick of temper, but rarely sullen, for his anger gathers and bursts and passes like a summer shower. Inquisitive as squirrels, they gather about you in every village at which you stop and ply you with questions as to your personal affairs. Yet all this is done with such perfect courtesy—and I may say, in passing, that it is exceptional to find a Greek who is not courteous and polite—and the questions are so plainly inspired by childish curiosity, pure and simple, that it is impossible to take offence. But apart from this frank and childlike simplicity, the trait that has always appeared to me most attractive and lovable in the Greek character is his unfailing hospitality. The person to whom you may come with a letter of introduction will place himself and his house at your command and seek in every way to be of service to you. Even the humblest peasant, at whose house you, as a stranger, may apply for a night's lodging, will receive you with a cordial welcome and will place his best at your disposal with a courtesy that goes far towards making you forget that you will be obliged to pass the night wrapped in a rug upon the floor instead of in a bed and that your morning toilet will, of necessity, be performed without the aid of a wash-basin or a looking-glass. Nor is the charm of your reception in any way marred by the knowledge that this same man, who is now seeking to the utmost of his ability to make you comfortable, will on the morrow present an exorbitant bill for the night's accommodations, for the Greek has the faculty of making you feel under these circumstances that he is, for the time being, your host and you his honored guest. And it is a strange thing, for which I cannot account, but nevertheless a fact, that when you finally ride away on the morrow, after having wasted perhaps a valuable half hour in bargaining before you have been able to settle the bill upon an equitable basis, it will be in a spirit of perfect friendliness, and in the future you will be sure to think of your quondam host, not as a rascal who tried to cheat you but as a person to whom you are indebted for generous hospitality.

To speak of Greece without alluding to its past is as impossible as to travel through the country without seeing the ruined monuments of former days; but as I wish to present for the most part the modern side of the picture, I will ask you to follow me as I retrace my steps over the ground which I visited some years ago during several trips to the Peloponnesus. As we approach Patras,

which is one of the centres of the currant trade in Greece, we see that the port is an open roadstead, protected by a long breakwater, behind which our ship comes to anchor. With its straight and broad new streets, its crooked and narrow old streets, its white stuccoed houses, and its broad, dreary squares, to which the pepper trees, with their graceful foliage and bright red berries, alone lend an element of charm, Patras is a typical modern Greek city of the better class. But even more interesting than the place itself to the traveller who has just landed are the strange street scenes and the unfamiliar costumes. The ride along the Gulf of Corinth, with the blue waters of the gulf hemmed in by rugged mountains on the left and on the right the littoral plain, with its vineyards, and the mountains of the Peloponnesus beyond, is one of the loveliest and most picturesque imaginable, for the railroad follows closely the curves of the shore, and as the train winds in and out around the various headlands the eye is met by a succession of beautiful pictures.

Three hours and a half after leaving Patras we arrive at the little station of Kiato, and, leaving the train, proceed on foot across the littoral plain to the village of Vasiliko, which lies some two miles back from the shore on the edge of the plateau that was once occupied by the ancient town of Sicyon. Here, in December, 1891, I passed a week in the house of a Greek peasant, George Demetrius, while engaged in excavations on the site of the ancient theatre. We found the people extremely kind and hospitable, and the experience, though in many respects a rather rough one, was not lacking in interest, nor was our stay unenlivened by amusing incidents. One that well illustrates the simplicity of the Greek character was a strike on the part of our workmen for higher wages. They based their demands principally upon the fact that they could obtain the pay which they desired by working in the vineyards; but when we disclaimed any wish to compel them to work for us for less remuneration than they could obtain elsewhere, and asked why they stayed with us instead of going to the vineyards, they practically destroyed their entire case by confessing with perfect ingenuousness that December was not the proper season for such work.

A half hour's ride from Kiato brings us to the straggling town of modern Corinth, which has grown up on the shores of the gulf since the destruction of the former village by an earthquake in 1857. The site of the ancient city, where the American School of Classical Studies at Athens are now carrying on excavations, lies some three miles and a half to the southwest at the base of the

Acro-Corinth, the isolated hill crowned by mediæval fortifications, which in olden days was the acropolis or fortified citadel of the city of Corinth. From this point we make a flying trip through Argolis, and visit the prehistoric town of Mycenae, with its Cyclopean walls; the site of the Argive Heraeum, or famous temple of the Argive Hera; the prehistoric fortress of Tiryns, with its massive fortifications; the walled city of Nauplia, with its reminiscences of the early days of the Greek republic, and the Hieron, or sanctuary of Æsculapius, at Epidaurus, with its glorious old theatre. From Argos we drive past the famous Lernaean spring, where Hercules, according to the legend, overcame the hydra, and across the mountains to Tripolitza, the capital of Arcadia. From this town a pleasant morning's drive can be taken to the site of Mantinea to the north; but an even more charming trip is that to the southwest through the swampy, maize-covered plain of Frankovrysis and across the mountains to the ruins of Megalopolis, which lie in the centre of a broad plain some 1,400 feet above sea-level, and to the site of the ancient Lycosura, charmingly situated among the mountains to the west of the Megalopolitan plain.

Returning to Tripolitza we there obtained horses for our trip to Sparta, for, though there is a good carriage road, we preferred to go on horseback. Our animals, which were small, undersized horses, about as large as full-grown ponies, were equipped with the usual heavy wooden pack-saddle, very uncomfortable in appearance, but with which, by the use of several rugs and by riding sideways, one can get along very comfortably. Instead of a bridle you have a halter, and guide your beast by pressing the leading rope or chain against his neck. A more helpless feeling than comes over one if, under these circumstances, his horse bolts, it is hard to imagine; but to the credit of the Greek horse be it confessed that you and he generally get on very peaceably together, and that his docility and surefootedness soon gain your confidence. Sparta itself comes upon the traveller with the shock of a great surprise, for it lies in the midst of grain fields and vineyards, in the centre of the broad valley of the Eurotas River, one of the most fertile districts that I visited in the Peloponnesus, and the inconsiderable remains of the ancient city embowered among olive groves and plantations of lemon and orange trees—for you will find at Sparta the largest and most luscious oranges in the world—give one an idea of the home of the old Spartans very different from that which the name usually suggests.

From Laconia we crossed the snow-capped range of Mt. Tay-

getus into Messenia by the famous Langada pass or gorge, which offers to the traveller some of the wildest and most picturesque scenery in the Peloponnesus. After a visit to Messene, with its admirably constructed fortifications, now overgrown with ivy, where we were most hospitably entertained by the monks in the Vourkano monastery, we travelled northwards through plain and mountain to the wretched village of Pavlitza, the ancient Phigalia. Here our party separated, and the others went still further north to the Apollo temple of Bassae, which is admirably situated in a lonely spot among the mountains, and which commands one of those extended panoramic views that seem to await the traveller at the summit of every hill and mountain in Greece. Our own route led us to the west through the mountains for a day and a half to the sea, and then across sand hills covered with a sparse growth of trees along the seashore. Just beyond the ruined fortress of Samikon we again turned inland, and travelling through the country over which Xenophon must often have hunted—for Scillus, the place of his exile, was close at hand—we crossed the Alpheus, the largest river in the Peloponnesus, and just at sunset arrived at Olympia.

The sanctuary of Olympian Zeus, the great national shrine of the ancient Greeks, lay in the valley of the Alpheus, between the bank of the river and the Cronus hill, and the following morning we visited the confused mass of ruins which were laid bare by the great German excavations within the Altis or sacred precinct. At the foot of the Cronus hill lie the ruins of the Heraeum, the oldest Doric temple known, and it was in the interior of this building that the most precious individual find of the excavations was brought to light. Prior to that time no original work by any of the great masters of Greek art had been known to us; but here, on the 8th of May, 1877, the Germans unearthed an original statue by the hands of Praxiteles himself, the god Hermes bearing upon his arm the infant Dionysus, the god of wine. Finer statues the Greeks may have possessed, but the exquisite finish of the marble, the graceful lines of the composition, and the idealized beauty of the head, with its pure Greek profile, make this statue for us the most perfect example of Greek art, and it forms a fitting close for our pilgrimage to the shrines of ancient Hellas.

NOTES ON CLIMATOLOGY.

BY

ROBERT DEC. WARD.

ATLAS OF METEOROLOGY.—The most important publication within the field of meteorology and climatology issued since the date of the "Challenger" *Report on Atmospheric Circulation* is certainly the new *Atlas of Meteorology*, prepared by J. G. Bartholomew and A. J. Herbertson, and edited by Dr. Alexander Buchan. This *Atlas of Meteorology* is Vol. III of Bartholomew's new Physical Atlas, and bears the date 1899. In 1887, twelve years ago, there was published an *Atlas der Meteorologie*, which formed a part of Berghaus' *Physikalischer Atlas*, and was prepared by Dr. Julius Hann, of Vienna. In Dr. Hann's atlas existing meteorological knowledge was summarized graphically on twelve plates, containing nearly sixty maps. The Berghaus atlas was superseded, so far as charts of temperature, pressure and winds were concerned, by the "Challenger" isothermal and isobaric charts, which embodied all the data available at the time of their publication. These "Challenger" charts have themselves had but limited use, because of their relatively high cost; but they have been reproduced on a small scale in several of the newer text-books of meteorology, and have thus become familiar to large numbers of persons.

The publication of the "Challenger" isothermal and isobaric charts, however, did not suffice to supply the need that has been increasingly felt during the last few years for a new atlas of meteorology, which should present all the latest information available for all parts of the world, and which should include not only charts of mean annual and mean monthly temperatures and pressures, but also charts of temperature ranges and anomalies; of rainfall, cloudiness, sunshine, etc. Bartholomew's new *Atlas of Meteorology* supplies this need fully, in every respect. Hann's atlas of 1887 contained, as has been stated, about sixty maps. This new Atlas contains over four hundred, all of them admirable examples of the highest development of present cartographic methods. In the preparation of this Atlas Messrs. Bartholomew and Herbertson

have had the constant advice and assistance of Dr. Buchan, and have also been effectively aided by Drs. Hann, van Bebber, Köppen, Angot, and Messrs. Willis L. Moore, and John Eliot, and the late Mr. G. J. Symons. In fact the Atlas, as it stands, represents, in the phrase of the preface, "the position of meteorology at the close of the nineteenth century." The labor involved in the preparation of the charts must have been enormous, for the data used as the basis for them had to be collected from the publications of many countries. The bulk of this work has been done by Dr. Herbertson, who is entitled to the highest praise for the able manner in which he has handled this material.

The thirty-four plates of the Atlas are arranged so as to fall under two heads—Climate and Weather. Under the former heading come the mean annual and mean monthly isothermal charts for the world, and for certain special countries, such as Europe, the United States, and India; the mean annual and the mean monthly isobaric and wind charts; the charts of sunshine, cloudiness, rainfall, etc. Under the second heading, Weather, there are charts showing the conditions under which typical and anomalous weather occurs in different countries. The pressures which prevail in abnormally hot or cold seasons and months in various countries, and which produce certain types of weather or certain kinds of winds, storm tracks and storm frequencies in different parts of the world,—these and other subjects are charted among the maps illustrating the general subject of weather. It is impossible to do this Atlas justice in a brief note. Recognizing the limitations of the work, as to size and number of maps, it seems to us impossible for anyone justly to utter a word of unfavorable criticism of the volume. Everything that anyone could wish for seems to us to be included. Both English and metric systems are used on the pressure and rainfall charts, and both Fahrenheit and Centigrade degrees are given on the temperature charts. The scheme of coloring is admirably adapted to bringing out the facts with the greatest clearness. If we were asked to name the two most important features of this new Atlas, we should say that they are as follows:—First, the charts showing the mean rainfall for the whole world for every month of the year. Second, the emphasis which is laid upon the weather types, normal and abnormal, of which climate is made up. Climate has too long been a dead mass of averages. The individual weather types which go to make up these averages have been hitherto almost wholly disregarded. The *Atlas of Meteorology* is certain to be welcomed not by meteorologists only, but by all men of science. It

is one of the most notable scientific publications issued in many years.

THE CLIMATIC ZONES OF SIBERIA.—An article by J. Y. Simpson, entitled *The New Siberia*, in the *Scottish Geographical Magazine* for January, lays emphasis upon the climatic zones of Siberia and the relations of these zones to human occupation. The country may be divided into three broad east and west zones. The tundra comes furthest north; then the taiga or belt of virgin forest, and lastly the more open zone to the south, which is largely agricultural. Between this last zone and the southern frontier come further the steppe region and the Russian slopes of the Altai and Sayan Mountains. In the tundra the subsoil is always frozen, the surface is a swamp in summer, where lichen and moss alone can grow. The climatic difficulty in the case of the tundra zone

> does not lie in the small number of degrees of heat registered in summer . . . but in the relative shortness of the summer that succeeds the long winter, and in the great extremes that are reached within so brief a period. Hence, it is not easy to imagine how—unless in the event of such circumstances as have lately made Klondike appear to many to be a desirable place of residence—this tundra zone will ever be of service to the Russian Empire, or support a population other than that of the scant subarctic tribes to whom its wastes are home.

The belt of virgin forest overlaps the tundra on the south, and is the largest of the three zones, occupying almost half of Siberia. The climate is somewhat less rigorous than on the tundra,

> but agriculture is almost entirely impracticable unless with enormous trouble in certain well-favoured clearings. For the rest, it is an interminable maze of Siberian poplar, spruce, larch, cedar, fir, and pitch pine, with a dense undergrowth, a place of gloom below and silent conflict in mid-air. From the south, however, this forest belt is being slowly attacked with hatchets, and, as it were, pushed farther north, so that one day the land will support many more than the 700,000 Russians and natives who at present are resident within it.

South of this forest belt comes the more open, agricultural zone, in which cereals can be grown. Here the summer is longer, and here the Trans-Siberian Railway is destined to work a revolution by bringing in hundreds of thousands of Russian peasants to till the soil, which is often very rich,—so rich indeed in many places that thirty to forty crops may be gathered without giving any long interval for the repose of the ground.

OSCILLATIONS OF CLIMATE AND THE QUALITY OF THE GRAPE CROP.—*Ciel et Terre* for March 1 notes that the association of German vine-growers has published detailed tables concerning the quality of the wine produced between the years 1820 and 1895. It

appears that the quality of the wine is closely related to the temporary fluctuations of climate. During dry and hot periods, corresponding to the years about 1830 and 1860, the wine obtained from all the German vineyards was, as a rule, superior to that obtained during the years about 1850 and 1880. Since the last-named year the average quality of the wine has noticeably improved. In all the grape-growing districts the curves of these two variables maintain a parallelism. The fact is, therefore, a striking confirmation of the oscillations of climate.

NOTES ON ANTHROPOLOGY.

BY

ROLAND B. DIXON.

CENTRAL ASIA.—In the *Revue Scientifique* (4th Ser. I. XIII; Nos. 6 and 7), under the title "Les peuplades retrouvées de l'Asie Centrale," M. Saint Yves sums up with admirable clearness the recent progress in unravelling the intricate history of Central Asia. Until within the last ten or fifteen years almost our sole guides in this labyrinth, in which migration followed migration, were the Chinese historiographers, on whose accuracy it was difficult to know how much to depend. With the great activity in exploration which has characterised this region during the last few years a great mass of material in the way of inscriptions, coins, and archæological remains has been brought to light, and with the help of this many questions have been solved. The successive invasions of Central Asia by nomadic hordes coming from Siberia; the resistance offered to their southward advance by the great block of the Chinese Empire; and the consequent spreading of the invaders eastward to Manchuria and westward and southwestward to Turkistan, India, Transcaspia and Europe—all this is made clear by the recent investigations. The period between the sixth and seventh centuries was that in which all three of the great religions—Buddhism, Islam, and Christianity (in its Nestorian form)—began their struggle in Asia, and first began to press forward into the heart of the continent. Of their mutual interaction and conflicts the inscriptions give ample evidence, and point unmistakably to the wide spread of Nestorianism. With the evidence afforded by these inscriptions, the ruins of monasteries and the cemeteries, we can the easier understand the foothold which Nestorianism gained in China itself. One fact of great interest is brought out by all these finds, and that is that in the main the Chinese historians were correct in their statements. We may hope, then, that with further investigation in the field, and with a thorough search of the immense mass of Chinese literature, eventually the veil may be lifted from a region which for ages has been the abode of mystery.

SMITH SOUND ESKIMO.—When in 1897 Lieut. R. E. Peary brought to New York a party of six Eskimos from Smith Sound, the opportunity of studying individuals of this isolated tribe was

not to be neglected. The work was undertaken by Mr. A. L. Kroeber, the result of whose investigations has recently been published in the Bulletin of the American Museum of Natural History (XII; pp. 265–327).

Living on the north-west coast of Greenland between 76° and 78° 18′ N. Lat., and separated from their neighbors to the south by the uninhabited region of Melville Bay, these Eskimos have been practically isolated from all contact with the outside world. Intercourse across Smith Sound with the Central Eskimos of Ellesmere Land would seem to have occurred long ago to a very slight extent, but to have ceased for a considerable period—long enough for the Smith Sound Eskimos to forget the construction and use of the kayak and bow. In numbers the tribe seems to be almost holding its own, as its numbers are about the same in the various censuses which were taken by Peary. Curiously, the men are greatly in excess of the women—a situation very unusual among the Eskimos.

A very interesting and full account of the customs and mode of life and religion of the tribe is given, in which all available information from the earlier Arctic explorers in this region has been incorporated. As a result of his study of these Eskimos, Mr. Kroeber is led to the conclusion that they are more closely allied to the Greenland Eskimos than to the Central Eskimos, as has formerly been the opinion. The Smith Sound tribe stands geographically and ethnologically almost between the two. The theory that the Angmagsalingmiut, or East Greenlanders, reached their present habitat, not by way of west and south Greenland, but by the way of the desolate northern and eastern shores, seems to be disproved. If this had been the route followed, it would be expected that the Angmagsalingmiut would show many points of close relationship to the Smith Sound Eskimos. This is not the case, however, and it seems highly probable therefore that

"the chain of ethnic relationship (and apparently the line of migration also) of the Eastern Eskimo is: Central Region, Smith Sound, West Greenland, East Greenland."

THE WYANDOTS.—In the *Archæological Report* (Ontario) for 1899 (Toronto, 1900, pp. 92–123), Mr. W. E. Connelly gives the results of many years' work among the Wyandots, dealing chiefly with their migrations and clan organisation. From their myths and legends he determines their original habitat as in the area lying between James Bay and the Labrador coast, north of the St. Lawrence. From here they went first south to the Great Lakes, and then settled on the

northern bank of the St. Lawrence, opposite the Senecas. A severe conflict with the latter led the Wyandots to remove along the south side of Lake Ontario to Niagara, Toronto, and finally to the region west of the Hurons, with whom they formed a league against the gradually increasing power of the Iroquois. Quite a full account of the clan system of the Wyandots is given, in which twelve clans are recognised. It is stated that there are traditions pointing to the fact that the Wyandots were accompanied throughout a part of their migrations by the Delawares (an Algonkin people). This is of considerable interest, as the home of the Algonkin stock is supposed to be in much the same region as that of the Iroquoian (of whom the Wyandots are a branch), and intimate relations must have existed between the two stocks.

MIGRATIONS OF THE ETHIOPIANS.—The Foulas, Foules, Peul, etc., as they are variously called, a West African people sharply distinguished from the negroes, have for some time been considered to be of East African origin and closely related to the Abyssinians or Ethiopians. In *L'Anthropologie* (Vol. X., pp. 641–662), Dr. R. Verneau discusses this theory at some length and from recent material from the two regions in question, and from intervening areas, shows quite conclusively, it seems, that the theory is true. The specific characters of the Abyssinians are found, with more or less admixture of negro traits, practically throughout the whole region which lies between Abyssinia and the easternmost extension of the Foules or Peuls. There has evidently, therefore, been a migration of the Abyssinian stock from east to west along the border of the Sahara and between it and the equatorial forests. The date of this migration is roughly placed in the XVth century.

NOTES ON GEOGRAPHICAL EDUCATION.

BY

RICHARD E. DODGE.

PHYSIOGRAPHY AS A COLLEGE ENTRANCE SUBJECT.—The science of physiography, or, as it perhaps may better be called, physical geography, will undoubtedly be greatly strengthened in its position in the near future through its being made an optional entrance subject in certain of our leading universities. The effect of this action will be not only to give physiography a position as dignified as that of physics or chemistry, but to encourage the teaching of the subject in all the better secondary and college preparatory schools of the country. This step further testifies to the fact that this somewhat composite science is as capable of giving efficient mental discipline and scientific training as the other sciences that have so long held their position, practically unchallenged, in the secondary schools. Harvard and Columbia Universities have both raised this subject to the rank of a college entrance option. In the case of Harvard, physiography may count one point of the required minimum of two points in science out of the total twenty-six points which a candidate must pass for admission, according to the new method. The subject may be offered also under practically the same conditions as an option for entrance into the Lawrence Scientific School, of Harvard University.

In the case of Columbia, however, the subject takes perhaps a still more important position, inasmuch as it may count for one point out of fifteen required points, of which not more than two can be in elementary science.

Inasmuch as in both these instances the requirement is much higher than can be attained by a pupil pursuing the subject in the first or second year of his secondary course, this means the inclusion of an elective in physiography in the later years of the courses of all those schools that desire to fit their pupils in all subjects for these universities. It is hoped that in the course of time the influence of secondary schools will have been so extended downward that geography teaching in the elementary school will have reached such a standard that pupils will not have to wait until their high school

course for an insight into the physical features of the earth, causally considered. Under the existing conditions, the consensus of opinion is that physical geography must occur in the first or second year of the secondary school course, and the latest and best recommendations of experts emphasize this point very strongly.

SUMMER SCHOOLS IN PHYSICAL GEOGRAPHY.—The demand of progressive teachers for summer opportunities for studying rational geography points, perhaps more strongly than any other fact, to the slow improvement of geography teaching that is coming about in the elementary schools, in answer to the continued endeavors of leaders in the subject during the last ten years. Practically every summer school or institute of any strength or size includes at the present time in its curriculum courses of greater or less length and completeness in geography.

It is in the leading universities, however, that the subject of geography receives the most concentrated and scientific attention, and progressive teachers can find the most serious help along the line of modern geography during their summer vacation. The University of Chicago, Columbia University, Cornell University and Harvard University will, during the coming summer, offer rich opportunities to teachers who desire to study special phases of geography. It should be noted, however, that in the University of Chicago the courses to be given are not a part of a special summer school, arranged for the needs of teachers, but the regular work of the summer quarter of the university, to which teachers are eligible. As a matter of fact, however, the courses in the other institutions noted are as nearly as possible the equivalents of certain parts of regular term courses. Possibilities for teachers are perhaps indicated by the following lists of courses given at the different universities. At the University of Chicago we find announced courses running for six weeks, five times a week, in elementary meteorology; oceanography; physiography of land surfaces, with a special reference to the United States, and the physical evolution of the North American continent—an outline course for teachers of geology and geography. At Cornell University there are six-week courses in the geography of North America three times a week, and in physiography five times a week, these courses being especially arranged for teachers. At Harvard University a course is announced in geography running for six weeks, five days a week, and devoted largely to the study of land forms, meteorology, and oceanography. At Columbia University, two courses are announced, five weeks,

six days a week—one in general geography and one in scientific physiography. In each of the universities the courses will be given with the full material equipment of the departments, and the effect on the two or three hundred students who will probably be attracted by the courses ought to be very great. Already the summer work of our universities along these lines has exerted a great influence upon the teaching of school geography, and it will not be many years before a large number of the teachers in our elementary schools will have been deeply influenced through such university work. It is to be hoped that other colleges and universities may feel the demands of the times and establish strong departments in geography in the near future.

AN EVIL THAT CALLS FOR CORRECTION.

Attention is invited to the following letter:

Incorporated 1851.

THE MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY,
SPRINGFIELD, MASS., April 4, 1900.

JOHN A. HALL, *President.*	HENRY S. LEE, *Vice-President.*
HENRY M. PHILLIPS, *Secretary.*	E. D. CAPRON, *Asst. Secretary.*
OSCAR B. IRELAND, *Actuary.*	H. W. HASKINS, *2d Asst. Secretary.*

A. A. RAVEN, Esq., Secretary,
American Geographical Society,
11 West 29th St., New York.

DEAR SIR:

I beg to ask whether it would not be in the province of your Society to remonstrate against a practice in map-making that seems to me quite likely seriously to mislead the young and others in search of information about the geography of our own country. I refer to the practice of publishing maps of the United States in which different scales are used for different parts of the map, without any explanation or obvious line of separation, the two scales in fact being sometimes used in the same part of the same map. The Chicago, Burlington & Quincy Railroad some time ago issued a map, engraved by Rand, McNally & Co., of this character. Taking the distance from Boston to Chicago as a standard, the distance from San Francisco to Denver is shown in reliable maps to be about 1.12 of this standard distance. On the map just referred to it is only about .9 of the standard distance, or 80 per cent. of what it should be. The distance from New Orleans to Duluth is shown on correct maps to be about 1.36 of the distance from Boston to Chicago; on the C. B. & Q. map it is about 1.25, or about 92 per cent. of what it should be. The ratio of the length of the southern side of Colorado to the length of its eastern boundary is really about 1.39; on the C. B. & Q. map it is about 1.21, or about 87 per cent. of what it should be. This map is mounted on rollers and got up in such a manner as to adapt it to use as a wall map, and is quite good enough in general execution to be preserved for reference.

More recently the New York Central Railroad has issued a map, prepared by the Matthews-Northrup Company, in which the distance from San Francisco to Denver is .64 of the distance from Boston to Chicago, or 57 per cent. of what it should be. The distance from New Orleans to Duluth is 1.04 of the standard distance, or about 76 per cent. of what it should be, and the State of Colorado is almost exactly a square, making the length of southern boundary 72 per cent. of what it should be in comparison with the length of the eastern side. This map is issued as a folder, and is finished in very attractive style. It is quite likely to be preserved, and quite good enough in general style to be fastened on a wall for study.

Of course cheap sketches of railroad routes are not expected to be accurate as maps, but when our wealthiest corporations issue in large quantities maps of this kind, prepared by the leading map-makers of the country, it seems to me that they are likely to do a good deal in the way of instilling ideas that must be afterwards unlearned, if one is to get at the truth, and that a protest from the American Geographical Society would be quite in order, and might be of some effect.

I remain,

Yours respectfully,

OSCAR B. IRELAND.

GEOGRAPHICAL RECORD.

AMERICA.

SHRINKAGE OF GREAT SALT LAKE.—The level of Great Salt Lake is reported to be steadily falling on account of the large volume of water, tributary to it, which is now absorbed by irrigation enterprises. The Jordan and Bear rivers, City Creek and other tributaries rise in the mountains to the east and, before they were intercepted by irrigation ditches, poured into the lake, the year round, about 10,000 cubic feet a second. The evaporation from the lake surface is very large, and the diminution in the supply is lowering the lake level. It is interesting to learn (*Deutsche Rundschau für Geographie und Statistik*, Jan., 1900) that a similar condition now exists in the Dead Sea, Palestine. That sea was formerly much larger than at present, as is shown by the old beaches, stretching at various altitudes along the basin. Since the middle of the century its level has been very slowly rising till quite recently, but now it is falling. This is due, not to natural causes, but to the increasing quantity of water taken from the Jordan and smaller streams by farmers, who are diverting all the water they can get to their lands. Some of the salt deposits covering the bottom of the lake may now be seen above the water in the shallower places and near the shores. But even though this desiccation should go steadily on it would take a long time to dry up the waters, for the lake is over 1,300 feet deep in the northern part of the basin.

DREDGING GOLD FROM THE SEA.—A number of companies and individuals are preparing to dredge for gold in the sea off Cape Nome, Alaska. This is a new phase of gold mining, and the result of the novel conditions under which gold is found in the Cape Nome region. The gold came originally from the quartz veins in the mountains of limestone and mica schist, from four to five miles inland. In the course of denudation a great deal of this gold-bearing quartz has been gradually carried by water agency down the gentle but continuous slope from the mountains to the sea. Mining was carried on last year along the beach sands for a distance of thirty miles, the gold being found in fine particles from two to five feet below the sand surface. It is also found, under similar conditions, beneath the sea for a considerable distance from the shore,

and dredging is possible because of the shallowness of the water for some distance from the beach.

THE TOCANTINS RIVER.—*Le Mouvement Géographique* says that writers on geography are only just beginning to treat the Tocantins river of South America as an independent hydrographic basin. It should be added, however, that some of the latest geographical works still treat the Tocantins as a part of the Amazon system. A geography recently published in England, for example, says that "The Tocantins form a part of the Amazon system, being only divided from it by some islands." A British school geography, published last year, gives the area of the Amazon basin, and includes the Tocantins in it. Most of the French geographers, likewise, make the Tocantins a part of the Amazon system. M. Reclus, in his description of the Tocantins in the "Universal Geography," several years ago, treated the system as a distinct basin, and was one of the first geographical writers to give the correct idea of it. The river rises far to the south, has a tributary, the Araguaya, which is even larger than the Tocantins, and the joint streams form one of the great rivers of the continent, with a width, for a long distance, of two or three miles; but the river is so impeded by rapids that it is scarcely available for navigation until it widens into the great estuary on which Pará stands. It reaches the Atlantic about forty miles east of the nearest delta branch of the Amazon. Some water from the Amazon enters the Tocantins through several narrow arms of the Amazon delta; but this fact does not make the two rivers a part of the same system any more than the Cassiquiare, which unites the Orinoco and the Rio Negro, makes the Amazon and the Orinoco one hydrographic system.

NAVIGATION OF THE BERMEJO RIVER.—The *Boletin del Instituto Geogr. Argentino* gives some description of the journey of the Messrs. Leach down the San Francisco and Bermejo rivers across the Gran Chaco of Argentina. These two gentlemen are among the most energetic promoters of industrial enterprises in the mountainous province of Jujuy. The San Francisco is part of the Rio Grande del Jujuy and empties into the Bermejo. The explorers had heard that the condition of these rivers had considerably changed and believed they might be found to be navigable. The Government supplied them with three boats specially built for their use, and on March 13 last year they started on their long journey. They found navigation difficult in the San Francisco, and it was a toilsome task dragging and pushing the boats and getting them afloat when they

ran aground. In eight days, however, they reached the Bermejo. At the point where the Rio Teuco branches off from the Bermejo the bed of the latter stream became almost dry; but the Teuco had water of sufficient depth, and they had no trouble whatever in descending that river to the point where it rejoins the Bermejo and thence to the Paraguay river, 146 miles further east. The Messrs. Leach believe that they have fully demonstrated the availability of the Bermejo route to the Paraguay as an outlet for the products of Jujuy. No report so favorable as to the navigability of the Bermejo was made by earlier explorers.

River and Flood Service.—The report of the Chief of the Weather Bureau for 1899 says it is proposed, during the next two years, if sufficient funds are available, to prepare a comprehensive work on the entire navigable water régime of the United States, giving a complete history of all river stations, elevations above tide water, rate of flow of water and data for flood forecasting. No work of this character has yet been undertaken, though its importance has long been recognized. According to the *Deutsche Rundschau für Geographie und Statistik* (Nov., 1899), the system of water forecasts in Austria-Hungary is somewhat similar to that in this country. In the Ministry of the Interior is a Hydrographic Division, with many stations in different localities, whose object is the study of all the rivers in the country and observations relating to precipitation and the height of river waters. The stage of water in all the rivers is reported daily, the observations being made at 8 A. M., and from these data forecasts for the following twenty-four hours are deduced and telegraphed to the Government.

EUROPE.

European Emigration in the Nineteenth Century.—According to an article in *Globus* (No. 24, 1899), about 30,000,000 persons left Europe during the century just closing to seek to better their fortunes in other lands. Up to 1820 only about 250,000 Europeans removed to the Americas, but between 1820 and 1882 more than 17,000,000 Europeans left their homes for the New World. The high tide of European exodus was reached in 1882, when the United States alone received 800,000 immigrants. The two next greatest years in this movement of population were 1888 and 1892, when this country saw 1,140,000 Europeans enter its ports. Between 1882 and 1893 the European outpouring to various marts of the world was over 9,000,000 souls. In the six years ending in

1899 about 3,000,000 Europeans sailed for foreign lands. The world never saw before anything comparable with this tremendous movement of people in so short a space of time as one century The population Europe has thus lost by emigration in a hundred years is greater than the total number of inhabitants of Great Britain and Ireland in 1860.

NOVOROSSIYSK FREEZES OVER.—In 1888 the Russians reopened the port of Novorossiysk, on the northeast side of the Black Sea. It has had very rapid development, has become a large wheat shipping port, and its population is now over 35,000. It exported only 46,000 tons of freight in the first year of business; while its exports in 1896, chiefly wheat, amounted to 767,000 tons. Its great recommendation was that its harbor was free from ice the year round. The port, however, froze over in December last, when none of the strongest vessels were able to reach the docks. The shipping business was practically suspended till a thaw came. The Russians, after all, cannot claim any Black Sea port to be unimpeded by ice in winter except Batum.

AFRICA.

PROGRESS IN MADAGASCAR.—*Petermanns Mitteilungen* (III, 1900) reports that General Gallieni is making excellent progress with the geographic and cartographic work began in 1897. His efforts are mainly directed in making a good map of Madagascar. Before the French took possession only the central province of Imerina had been trigonometrically surveyed. The map sheets now completed include 12 sheets on the comparatively large scale of 1:100,000; 3 sheets in 1:500,000, and a one-sheet map of the entire island in 1:2,500,000. The map on the largest scale, 1:100,000, will at present be completed only for the central province, the east coast region and Diego Suarez. When the map of the whole island on this scale is completed it will number 508 sheets. The triangulation thus far carried out has called attention to many errors in the position of places shown on earlier maps. It is gratifying to observe that such excellent progress is making in the mapping of Madagascar, the fourth largest island in the world. The French are making important progress in Madagascar, and the island is sure to have large commercial development. The canals, about one and four-sevenths miles long, which are being cut through the hills that separate the lagoons bordering the sea between Tamatave and Andovoranto, sixty miles south, will be completed this summer (*Revue Française*

de l'Etranger et des Colonies, Feb., 1900). This will give a waterway for passengers and freight extending one-third of the distance on the regular caravan route between Tamatave and Antananarivo, the capital. Thirty miles of this water route were opened for business on May 15 last year, and up to November 1 more than 8,000 passengers were carried, and an average of 30 tons of merchandise was transported daily. The canal will not interfere with the projected railroad from Tamatave to Antananarivo, which, however, will not be built immediately. *Le Génie Civil* says that the wagon road between Tamatave and the capital, to supplant the miserable path that caravans have followed for generations, is now about two-thirds completed, and that the other important wagon road from the capital to Majunga, the chief west coast port, has been completed.

THE TELEPHONE ON THE CONGO.—*Le Mouvement Géographique* (No. 7, 1900) says that Boma, the capital of the Congo Free State, fifty miles from the mouth of the river, has been placed in telephonic communication with Kwamouth, 450 miles up the river. As the electric current was not sufficiently strong to carry messages direct from Boma, the town of Tumba, 180 miles distant, was made an intermediate station. The operator there telephones the message to Kwamouth, 270 miles, and in a very few minutes several sentences are thus transmitted between the lower and upper Congo. The extension of the telegraph and telephone service on the Congo is doing a great deal to facilitate business. The commerce of that region is having a large development since the completion of the railroad between Matadi and Stanley Pool nearly two years ago. Last year about 700,000 pounds of ivory, collected by steamers on the upper Congo, were carried down on the railroad and sent to the Antwerp market. Rubber is now gathered at much greater profit, since it no longer has to bear the heavy charge of transportation for 235 miles on the shoulders of porters. In 1887 the amount of rubber collected in the Congo basin was 30 tons, valued at $23,000. In 1899 the rubber collected in the Congo forests amounted to 3,300 tons, the export value of which was $9,900,000. The new railroad is also helping the development of navigation on the upper Congo and is stimulating other railroad enterprises. A railroad is now building north from Boma into the French territory of Majumba, which is rich in ivory and rubber and well adapted for large plantations. The road is to be 130 miles long, and the first thirty miles from Boma are now completed.

THE TELEGRAPH TO VICTORIA NYANZA.—The telegraph line from the Indian Ocean to Ripon Falls, where the White Nile leaves Victoria Nyanza, was completed in March. The cable does not yet touch at Mombasa, which is the sea end of the land line. Despatches from Victoria Nyanza must therefore be sent by steamer to be put on the cable at Zanzibar, which occasions a delay of several days. Five years ago, when the building of this line and the railroad alongside were begun, the shortest time in which news from the lake could reach Europe was about four months.

WESTERN MAURITANIA.—In November, 1898, Mr. Coppolani of the Algerian government was sent on a mission to the Moorish and Tuareg peoples, in the west part of the Saharan possessions of France, to establish friendly relations and study the development of Islam in this vast territory, which lies between Senegal and Morocco and forms the hinterland of the large Spanish territory of Rio de Oro. His mission was successfully accomplished. Very friendly relations were established with the people, and the region will hereafter be called Western Mauritania, and will be attached to the government of Algeria under the supervision of Mr. Coppolani. (*Le Tour du Monde*, No. 7, 1900.)

MISCELLANEOUS.

THE WEST AUSTRALIAN GOLD FIELDS.—Gold was not discovered in West Australia till 1885, and the fact that in fifteen years this region has become one of the greatest gold producers gives particular interest to the statistics from the *Scottish Geographical Magazine* (March, 1900) showing the present condition of the industry. The output of gold in 1890 was only 22,000 ounces, valued at $430,000. In 1898 it was 1,050,183 ounces, valued at $19,953,395. For the nine months ending Sept. 30, 1899, the output amounted to 1,160,000 ounces, valued at $22,000,000; and for the month of September alone it was 167,076 ounces, valued at $3,174,450, which was more than $80,000 over the best previous record.

TRAVELS OF THE JIGGER.—*Le Tour du Monde* says that the jigger, the small species of flea whose native home is tropical and subtropical America, and whose travels across Africa to Zanzibar were reported a few months ago, has arrived almost simultaneously in India and Madagascar. He was taken to Bombay by coolies returning from Africa. Letters from Nossi Bé, in northwest Madagascar, report his advent there and on the adjoining islands, where he is flourishing and multiplying in the sandy soil. All regions near or in the tropics seem destined to make his acquaintance.

POLAR REGIONS.

ACCORDING TO *Petermanns Mitteilungen*, No. 1, 1900, Dr. Otto Nordenskiöld will lead a Swedish South Polar expedition in July, 1901. His plan is to explore the lands to the south of America, and to establish a winter station on the South Shetland Islands, while his ship is to push as far to the south as possible in the summer of 1901–1902*, returning to the station before the setting in of winter.

THE EXPLORING STEAMER *Southern Cross*, with the Borchgrevink expedition sent out in August, 1898, by Sir George Newnes, arrived at Bluff Harbour, New Zealand, on the 1st April. Mr. Borchgrevink's telegram to Sir George reads:

> Object of expedition carried out. Furthest south with sledge; record, 78.50. Present position of South Magnetic Pole located. Zoologist Nicolai Hanson dead. *Southern Cross* safely at Stewart Island. Leaving for Hobart. All well.
>
> BORCHGREVINK.

Ross's highest latitude was 78° 10′ S. He assigned the position of the South Magnetic Pole to 75° 5′ and longitude 154° 8′ E. (*Voyage*, Vol. II, Appendix, No. X.)

IT IS ANNOUNCED THAT a Scottish expedition is to be organized to work in conjunction with the British and the German Antarctic expeditions. The sphere selected for exploration is the Weddell Sea quadrant, south of the Atlantic Ocean, while the British will explore to the south of the Pacific and the Germans to the south of the Indian Ocean.

The Scottish expedition is a private enterprise, under the charge of Mr. W. S. Bruce, who visited the Antarctic in 1892 and 1893, and has since made five voyages to the Arctic.

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* Perverse fate and the printer of the *Mitteilungen* send the ship on her way in 1891/92.

OCEANOGRAPHICAL NOTES.

BY

WILLIAM LIBBEY.

OBSERVATIONS ON THE OCEANS.—The publication of observations upon the oceans is discussed by Dr. Köppen in the *Annalen der Hydrographie und Maritimen Meteorologie*, Heft V, 1899. After a carefully-prepared statement of the history of such publications he suggests three methods of procedure:

1. The publication of a portion of these observations in the form of synoptic tables or charts;

2. The publication of certain good "log books" *in extenso*;

3. The printing of short reports of voyages, from which could be derived:

a. The contents of the "log" for given times and places.

b. Some of the principal features of certain climatic zones.

These suggestions are followed by a series of applications showing how such materials could be utilized.

A LARGE NUMBER OF OCEANOGRAPHICAL WORKS are reviewed in *Petermanns Mitteilungen*, Vol. 45, No. 5, 1899.

Professor Dr. Krümmel first takes up the chart of ocean currents produced last year by Dr. Gerhard Schott. Pointing out the fact that all such wall maps are behind the times, he calls attention to the fact that the construction of this chart makes it impossible for any one to follow its details at a greater distance than ten feet. Another criticism is based upon the idea that the draftsman seemed to think it necessary to construct a complete set of currents, and consequently drew curves and lines where it is a physical impossibility for currents to exist, as, for example, in the Pacific Ocean off the coast of New Zealand. This criticism is very well founded, as it is very desirable that only well-authenticated facts and observations should be embodied in charts of any sort. Inferences should be indicated in some way to carry the information that they are not based on observed facts. Professor Krümmel then points out some divergences between Dr. Schott's work in the Handbook of the Marine Observatory and in the wall map—notably in the limitations of the Brazil Current and the Agulhas Current, where it

appears that the Handbook is more in accord with the state of our knowledge than the wall map. Another criticism is based upon the omission of the cold ice-bearing current west of Spitzbergen. The position of the Guinea Current in winter does not agree with the arrangement of the Isotherms, and the same is true in connection with the currents of the Gulf of Panama. These are, however, but isolated points in a map where there is much that is of a high character that is well worth careful study.

To the strictures upon the wall map, Dr. Schott replies in *Petermanns Mitteilungen*, Vol. 45, No. VII. He states that he prepared a map of currents, and not of temperature curves, and that the discrepancy between the map and the handbook is due to the necessity of having text and map in accord. He cites numerous authorities for his position as against Professor Krümmel.

Dr. Krümmel also reviews the article of M. J. Thoulet in the *Bulletin* of the Paris Geographical Society, Vol. 18, 1897, pp. 5–33. This paper relates particularly to the sedimentary deposits on the coasts of France.

Thoulet thinks rightly that the shallow waters of the coast are of interest not only to the geologist, but to the navigator, the fisherman, the cable engineer, and also that they may prove useful in a practical way, since phosphates may eventually be obtained from this source. He criticises the German Fisheries maps because they appear only in black and white; whereas he believes shades of color would be better.

Dr. Krümmel points out the difficulty of using such finely colored maps on board a vessel when all is wet and the touch of a single dirty finger will damage or destroy their usefulness.

Thoulet gives directions for the preservation of specimens by drying them upon a plate and then putting them in a bottle with a paper bearing the locality and date. A clear classification is given of these sediments, based upon their mineralogical character and the size of the grains. The latter point is determined by the use of gauze sieves until nothing but the amorphous components are left behind, *i. e.*, such as cannot be determined to be mineral in composition by the microscope, and will not deposit more than 10 per cent. after standing for 40 minutes. Their composition is to be determined chemically as to whether they are limestone or clay.

The transition from sandy to clay bottom it is proposed to classify under four heads:

1, *Sand*, where up to 10 per cent. of clay is present; 2, *muddy sand*, where 10–30 per cent. of clay is found; 3, *sandy mud*, con-

taining 60 per cent. of clay; and 4, *mud*, where there is from 60–100 per cent. of clay.

A color scheme is proposed which is well considered, and the criticism that the transitions are too gradual to be traced is met by the well-founded assertion that there are definite boundaries in nature which can be located. Thoulet proposes to interest a wide circle of amateurs in this work, in the way of gathering material, the specimens to be sent to some central station for analysis and classification. This would be a fitting sequel to the work of Delesse upon the *Lithologie du fond des mers*, and could appropriately be carried out by France in commemoration of the labors of that eminent student.

The third of Professor Krümmel's reviews deals with the discussion of the results obtained by means of the "Flaschenposten" of the German Marine Observatory. (*Archiv der Deutschen Seewarte*, Vol. XX, No. 2.) The courses taken by 643 bottles are discussed; 452 from the North Atlantic, 102 from the South Atlantic, 43 from the Indian, and 46 from the Pacific Ocean. It appears from a large number of similar observations that it makes very little difference whether the bottles are weighted with sand or not. It does not appear from the discussion what percentage of the bottles put in the water was heard from, but, judging from the results obtained by the Prince of Monaco, it can hardly be over eight or nine per cent.

Many valuable results were obtained by this means, however—as, for example, the course of the subdivisions of the Gulf Stream in the Bay of Biscay; the proof that there is no longer such a thing as the Rennell Current, already shown by the labors of the Prince of Monaco; the concentration of the currents of the tropical Atlantic toward the Caribbean Sea, where they form the centre of energy for the Gulf Stream, etc.

New light is also thrown upon the course of the currents southeast of the Cape Verde Islands. A confirmation of the theory that the earth's rotation plays a large part in the direction of these currents is readily obtained from the study of the curves in the high southern latitudes upon the chart.

It is important to note—though the fact is not new—that these currents, even when weak, are found contrary to the direction of the wind.

Secondary Tidal Undulations.—In the *Transactions of the Royal Society of Canada* (Second Series, Vol. V, Sec. III, page 24), Mr. W. B. Dawson, C.E., presents an account of observations

obtained by recording tide gauges in Nova Scotia. The localities chosen are Halifax, St. Paul Island, N. S., Yarmouth, N. S., and St. John, N. B. The progress in the tide is in the order of the places named, and its range increases in the same order.

It appears from the facsimile reproductions of the records that these secondary undulations are almost continuously present, although their range varies; the range being in the cases mentioned from an inch or two to four feet. In the case of Halifax this range is 33% of the range of the tide, at St. Paul 10%, at Yarmouth 45%, and at St. John, N. B., 11%. The undulations are most conspicuous on the traces at the times of high and low water.

No theory is advanced for these wavelets upon the tidal wave. It is, however, pointed out that they occur chiefly at times of storm disturbances. In any theory explaining the undulations a careful distinction should be drawn between their originating cause and their progress, as the examples given seem to indicate that the range of the undulations does not become magnified in the same ratio as the tidal undulation under the influence of the general features of the coast.

This problem has been taken up by Mr. Dawson in a region peculiarly fitted for such work, since the tides range from the highest in the world to a very flat tidal curve, which is almost inappreciable except at the spring; and only these secondary undulations are left in addition to the traces of storm disturbances. Records have now been secured at eight different stations, covering periods of from two to four years. The data thus obtained would almost seem to be sufficient to warrant some conclusions, but the Tidal Survey has so far not been able to take up the subject.

RELICS OF THE NARES EXPEDITION RECOVERED BY MR. PEARY.

Mr. Herbert L. Bridgman, Secretary of the Peary Arctic Club, sends the following account of the relics recovered by Mr. Peary in the summer of 1899 and forwarded by the Club in his name to the Museum of the Royal Naval College at Greenwich:

The Peary Arctic Club sends to-day (April 18) to the Museum of the Royal Naval College, at Greenwich, London, the mariner's sextant left at Repulse Harbor in 1876 by Lieut. (now Admiral) Beaumont during his heroic retreat; picked up and brought in eight years after by the late Lieut. James B. Lockwood, on his return from his memorable Farthest North expedition, and recovered from Fort Conger in May last by Civil Engineer Robert E. Peary on his sledge to his ice-bound *Windward* in Allman Bay, from which it was brought to Brooklyn by the *Diana*, the steamer of the Peary Arctic Club. With the sextant is also transmitted the original record deposited by Capt. (now Admiral) Sir George Nares in a cairn on Norman Lockyer Island, whence it was taken, last fall, by Mr. Peary, and transmitted with other dispatches and papers to the Club by the ship of last summer. The sextant, though exposed to the Arctic elements for eight years, is to-day in almost as good condition as new, perfectly serviceable, and with a little care would be restored to perfect condition. The mahogany case containing it, through the intense cold, is cracked along one side, but the instrument and its attachments are substantially in good working order. The sextant is one of the finest make and graduation, its eye-piece and other portions, which in use would come in contact with the person, being carefully protected by leather, so that the danger from contact with the intense cold would be avoided. The duplicate glass which accompanies the sextant is also in perfect condition, and altogether the instrument is remarkably little worse for wear after its almost thirty years' absence from the service to which it belonged.

Admiral Nares' record—on two large foolscap sheets, bearing the official heading of the Admiralty—is also in a remarkable state of preservation. The paper is as clear and spotless, the ink as black and perfectly legible, as on the day when deposited, proving the remarkable purity of the northern atmosphere, by which all moisture and consequent discoloration are completely avoided. The text of the Nares record is in full as follows:

ARCTIC EXPEDITION, H. M. S. ALERT, Sept. 7, 1876.

Her Majesty's ships Alert and Discovery arrived here on their way South toward Port Foulke. The Alert wintered in lat. 82 degrees 27 minutes N., long. 61 degrees 22 minutes W., inside grounded ice. The Discovery wintered in a sheltered harbour in lat. 81 degrees 44 minutes N., long. 65 degrees 3 minutes W. The sledge crews of the Alert, after a severe journey over the ice, succeeded in attaining lat. 83 degrees 20 minutes 30 seconds N.; and the coast line from the winter quarters of the Alert to the northward and westward was explored to 82 degrees 23 minutes N. long. 70 degrees 30 minutes W. Sledge parties from the Discovery explored the north coast of Greenland to lat. 82 degrees 21 minutes W., long. 52 minutes W. (approximately), a distance of seventy miles beyond Repulse Harbour. No land was sighted to the

northward of the above explorations, except a few small islands at the extreme of the Greenland coast explored. Lady Franklin Sound was explored by the Discovery, and was found to run s. w. sixty-five miles and terminate in ten small bays; also, Petermann Fiord for nineteen miles, and was then found to be impassable for sledges, owing to glacial ice.

A seam of coal 23 feet thick was discovered in the neighbourhood of the Discovery's winter quarters.

Scurvy attacked nearly all the men employed in sledge travelling in both ships.

Four deaths have occurred. Belonging to H. M. ship Alert: Niels C. Petersen, interpreter, on the 14th of May, at winter quarters, from the effects of a severe frost-bite, which necessitated a part of each foot being amputated, followed by exhaustion and scorbutic taint; George Porter, gunner, R. M. A., on the 8th of June, of scurvy and general debility, when absent on a sledging journey, and was buried in the floe in lat. 81 degrees 44 minutes N. H. M. S. Discovery: James J. Hand, A.B., on the 13th of June, Charles W. Paul, A.B., on the 29th of June, both of scurvy, and are buried in Polaris Bay.

The ice in the Polar Sea broke up on the 20th of July, and on the 31st the Alert left her winter quarters, and on the 12th of August rejoined the Discovery. Both ships left Discovery Bay on the 18th of August and proceeded South.

A boat and a depot of biscuit and stearin is left on the fiord point north of Cape Hawks.

G. S. NARES, Captain R. N.,
Commanding Expedition.

Both sextant and record were tendered to the Lords of the Admiralty by the Peary Arctic Club, in accordance with the suggestions of Mr. Peary, who transmitted them last summer, and the response was prompt and appreciative. The transmittal and presentation will be through Alfred C. Harmsworth, of the London "Daily Mail," an honorary member of the club, and giver of the *Windward* to Mr. Peary.

BOOK NOTICES.

A Forgotten Historical Landmark.—(*Byzantine Constantinople: the Walls of the City, and adjoining Historical Sites, by Alexander Van Millingen, Professor of History, Robert College, Constantinople. pp. xi and 361, with maps and illustrations; London, John Murray.*)

Utter degradation caused the fall of the Eastern Empire before the attacks of the Ottoman Turks. The ordinary reader remembers this degradation and turns his attention to less stagnant portions of the stream of history. Yet Constantinople was of unique importance in the world's history during a long period before its conquest by the Turks. It is a landmark of a struggle extending through ten centuries, which secured to Europe time for consolidation and for cultivation of intelligence and of power. It contains within itself to-day the buried relics of a heroic service to mankind. Its dilapidated walls strike the traveller as a fitting framework for the modern city, chiefly marvellous as a monument of neglected possibilities. Yet those walls represent the identical fortifications which stemmed the tide of more than one Asiatic invasion of European soil, and which caused repeated blows of the sword of Islam to fall harmlessly, as from impenetrable mail. During 900 years Islam clung to its hope of conquering all the world, and during eight hundred years of that time its chief obstacle was the sturdy Christian soldiers who manned the towers of that mighty encircling wall described in the book of Professor Van Millingen. To all appearance, without those walls as a barrier Europe would have been made Mohammedan territory before the tenth century.

The whole story of Constantinople abounds in interest to universal history. Demosthenes made the seizure of the ancient Byzantium the essential feature of one of his fervid appeals for the men of Athens to put bounds to the ambition of Philip of Macedon. When Constantine the Great selected the place as the site of his eastern capital, it was because he saw its tremendous importance to any man possessed by the ambitions of Imperialism. When Theodosius enlarged its limits and Justinian beautified its ecclesiastical establishments, they had appreciated its power of control over vast regions of Western Asia. Placed upon its hills at the point where the two continents approach each other from the east and

from the west, and throwing its suburbs and its fortresses upon both shores of the narrow strait of the Bosporus, so that it actually stands upon two continents, this peerless city has within it the power of a controlling influence upon the destinies of a considerable part of both Europe and Asia. The study of what it has been we owe to our own understanding of the past and to our foresight of the future.

One of the features of life in Constantinople to-day is the extraordinary number of Asiatic peasants who annually come up to the city for work, and of Asiatic merchants who come there for trade. They stay in the city for four or five years or more, and then go back to their distant homes to enjoy the good things which they have gained. There is reason for believing that this has always been a characteristic of the city. Its population has been cosmopolitan, and, to a very great degree, mobile and floating. Probably not half of the present population of the city were born there. This fact explains the perpetual renewal of the influence of the city under all régimes, and it also explains some of the most surprising facts of its weakness, when war found it unable to man its walls satisfactorily, and when its military successes found no local Homers to immortalize them. So little is the interpretation of those old ruined walls known to the multitude, that Professor Van Millingen feels it necessary to explain and almost apologize for giving time to his minute examination of dusty records and dustier fragments of ruined structures. For at the very outset he explains that "the Empire, of which New Rome was the capital, defended the higher life of mankind against formidable antagonists, and rendered eminent service to the cause of human welfare. This is what gives to the archæological study of the city its dignity and importance."

His book is a manual for the archæologist bent on understanding as far as possible the various epochs of the city's growth, and on fixing the scenes of its historical episodes. The student of the archæology of the city is met at the outset by voluminous and often pretentious writings, which claim to fix every site of importance. As he reads more extensively he is entangled in a maze of contradictions found to exist between modern and even scholarly writers on the subject. And it is only upon resolutely entering into the study of the whole literature of Constantinople, as Prof. Van Millingen has done, that even the elements of the problem of the topography of Constantinople begin to loom out of the haze with any distinctness. This work of drudgery, which places the student

in a position to judge the problems for himself, is one of the most notable and one of the most admirable features of "Byzantine Constantinople." Not only the historical writers have been called upon for testimony, but the ecclesiastical writers have been painfully examined for chance allusions to the neighborhood of their churches and their monasteries. Even the Bollandists, and their records of the saints of the church, have been compelled to add testimony for the solution of some intricate problems of the topography of the city, where some of the saints did their mighty works. The tireless thoroughness of this part of the work deserves all praise, while the abundant quotation of the actual words upon which important decisions depend fixes the value of every opinion of the author.

An example of this kind of study of authorities is found in Prof. Van Millingen's treatment of the question of the district of the Hebdomon. The Hebdomon (*τὸ Ἑβδομον*, "septimum") is mentioned in many accounts of great court functions of the Empire, and as a place of rendezvous for military expeditions before entering upon campaign. Here, too, the people were wont to resort both for pleasure and for refuge from earthquake and pestilence. The name occurs so frequently as to make the identification of the site quite important in attempts to reconstruct the scene. Yet the most part of modern writers on Constantinople follow Gyllius in his blundering supposition that this was the name of a place on the Theodosian walls. Prof. Van Millingen remarks that "of all the mistakes committed by students of the topography of Constantinople, none is so preposterous or inexcusable as this identification." The truth of this strong language is supported by conclusive quotations from Sozomen, Theophylactus Simocatta, Zosimus, Idatius, John of Antioch, Cedrenus, and others, and followed up by citations to show that the Hebdomon must have been upon the Sea of Marmora, and not upon the city wall. A survey of the requirements of the case then makes it easy to see, not only that the Hebdomon could not have been where the guide-book class of works unanimously place it, but that it could only have been in the vicinity of the village now known as Makrikeui, whose plains afford the necessary conveniences for military camps, and whose distance from the city agrees with the requirements of the name.

This clear and convincing method is followed with the question of the site of Constantine's walls, of the Harbors of the city, and of the sites of the various imperial palaces. All of the perplexing questions respecting the topography of Constantinople are not cleared up by this work. In fact, in regard to some of them one is

tempted to sympathize with that famous Turkish judge who wished that he had not heard the testimony of the defendant, since "it tended to unsettle his mind." But in all of the questions treated a solid basis for a judgment has been established, which will quickly become conclusive as soon as a period arrives when some slight excavations can be made.

Among these unsettled questions which both baffle and stimulate enquiry is that of the Harbors of Constantinople and that of the Tower or Towers of Anemas, in the walls of the city. In modern times the great steamships of commerce find the harbor of Constantinople almost too narrow for their manœuvring. Its great depth alone saves it from the stigma of being incommodious. But in the days of the Byzantine Empire the masters of the little sailing craft, then representing maritime architecture, never dreamed that this place was a harbor. Byzantines always speak of it in their writings as "the Gulf" or "the Gulf of the Golden Horn," and describe as harbors small enclosures, where their fragile vessels might find shelter from the eddies and currents which sweep through all the waters of the city. The most of these little harbors have been successfully identified, and data for the others have been collected. The pick and shovel must do the rest.

As to the Towers of Anemas there is so much of romantic story connected with this place of political punishment that one could wish the result of investigation more conclusive. All that has been learned by the careful survey and study of the twin towers commonly called the Towers of Anemas, or the Tower of Isaac Angelus, and the Tower of Anemas, has been that the present structures are patchwork, which fit no one of the descriptions of the places under examination. Here, again, there must be an appeal to the pick for final proof.

This brings us to one of the difficulties of the study to which Prof. Van Millingen has given so many years of his time of recreation. Constantinople is a city of so great antiquity that its structures contain superimposed sections almost as diverse as those of the Troy of Schliemann. If the wall, or a tower of it fell, an emperor of some subsequent age hastened on the approach of danger to pick up all the convenient fragments and work them into a new form of the old work. During the time of the Greeks there may have been some attention to replacing the fallen slabs and inscriptions in their former places, and at least right side up. But after the Turks took the city they had no such sentimental ground for guiding the disposition of an inscription or a sculpture. Hence one

is often bewildered by the appearance of inscriptions which would revolutionize the whole relations of a given site, if one could only be sure that they did not come from structures in quite a different locality. Other difficulties—which Prof. Van Millingen does not mention—are the suspicious nature of the authorities, who often hinder investigation through fear that the student is a seeker after hidden treasure revealed to him by his knowledge of ancient literature, and such physical hindrances as the great earthquake just alluded to on p. 150, when the author and his photographer were in the dark profundities of one of the ancient subterranean structures of the city wall at the time of the greatest earthquake experienced in Constantinople in two hundred years. There was no exit save by a passage thirty feet long, through which one had to wriggle on his stomach as best he could. In that noisome place those archæologists had to endure the full force of succeeding shocks, with all the noises of grinding walls and falling towers; noises magnified by the conducting power of the great mass of masonry over their heads. And when they did safely emerge into the light of day it was to see the whole atmosphere red with the dust of fallen ruins and to learn that hundreds of people had been killed in the city during those few terrible seconds.

This book is an archæological manual. But this does not signify that it is only this. Its identifications of sites give opportunity, which is admirably utilized, for interesting and readable memoranda upon the Byzantine court and its historical personages and their customs and relations. A set of maps and plans unique in their accuracy of detail, and a fine set of views of important parts of these old walls of Constantinople, add greatly to the value of the book to the student and the general reader.

H. O. D.

Morphologie des Tiën-schan, von Dr. Max Friederichsen. Mit einer Originalkarte. Sonder-Abdruck aus der Zeitschrift der Gesellschaft für Erdkunde zu Berlin, Band XXXIV, 1899.

This interesting monograph gives a comprehensive account of one of the great mountain systems of Central Asia. The author does not write from personal study of the region, but justifies his attempt on the ground of a rich but unappropriated Russian literature of the subject. The accompanying map is clear, and embodies a great variety of facts concerning the orography and hydrography of the region. Thus we have altitudes, as determined from one to

three times by barometer, also by estimate. We find also the passes, with their altitudes, stream courses, explored and conjectural, and the high snow-fields. Routes of trade are shown, with settlements, areas of blown sand, and tracts below sea-level. Superimposed on this map we have upon transparent paper a chart of the lines of later exploration, from Semenov (1857) to Sven Hedin (1896).

The preface discusses the difficulty of writing modern geographic names. This is partly due to the fact that students of the earth are not familiar with linguistic knowledge. Here the difficulty is special, because the original Turko-Tartar or Chinese word is subject to a double transfer, first by a transcription into Russian sounds and characters, and, second, by bringing over these terms from Russian maps and accounts of travel into English, French and German works.

Our knowledge of the mountains of the interior of Asia is the fruit of researches of the naturalists of the century now closing. Reference is, however, made to the work of Pallas (1777), as introductory to the better results of Klaproth, Humboldt, Ritter, and especially of von Richthofen. The name Tian Shan is of Chinese origin, meaning Heaven's Mountains, and was at first applied only to the eastern Tian Shan of our modern maps, reaching perhaps not farther west than Khan-Tengri. Von Richthofen extended the use of the name, on the basis of common strike lines, over the Alai, Pamir and Hindu Kush. This study, however, does not include these groups, nor the Altai on the northeast, but comprehends the mountain mass lying between these limits, as constituting the proper Tian Shan. The surrounding desert and steppe regions are included so far as is needful for the understanding of the mountain system. Within these limits Dr. Friederichsen gives an analysis of horizontal distribution, of the altitudes and of the hydrographic, geologic, tectonic and climatic relations. The author aims at a morphology of the Tian Shan within the limits of Richthofen's law of scientific geography, as dealing with the surface of the earth itself, independent of its vesture and inhabitants, in a domain peculiarly its own.

A considerable section is occupied with a review of the sources of our knowledge. Here chief credit belongs to the Russians. Others, as the English, have usually only touched the borders of the region, or come up to the foot of the mountains. Russian research has developed with the growing influence of that Empire in China. Particular credit is given to Semenov, and, in language of

peculiar interest to the physiographer of to-day. Originally a zoölogist, he had also a good knowledge of geology, and an *understanding for the dependence of surface form upon inner structure.* Thus his researches in Kara-ton, the Alexander mountains and the Naryn mountain land have real value, and he first recognized the two prevailing trends of the region. The maps are also, of course, chiefly a Russian product. Especial mention is made of the map of the Southern boundary of the Russian Empire, on a scale of 1:1,680,000, prepared under the direction of an officer of the War Department.

The Tian Shan lies between 40° and 46° N. lat. (that of north and middle Italy), and between 68° and 92° long. east from Greenwich. The greatest length of the system is about 1,956 km. (1,216 miles). This is more than twice the length of the Alpine system. Taking the principal trends of the Tian Shan we find some ranges on the northwest border of the system diverging in various measure from an east by west line toward the northwest. In the interior, both in the east and west, the prevailing lines are northeast by southwest. The parallel ranges are more numerous and are wider toward the west, but fewer and narrower on the east. To the converging of these two lines of strike is due the arrangement in gentle curves, concave to the north, which is seen on an inspection of the map.

Much is dependent upon these features. Thus the great rivers occupy longitudinal valleys. In the angle where two trends meet human settlement finds shelter. Through the broadening and diverging on the west, the mountains open themselves to commerce in that direction, while they stand wall-like on the east, as a barrier to trade. Thus these westerly-opening "compartments" have, in the later days, offered easy conquest to the colonizing, conquering spirit of the Russians. About these mountains extends a girdle of desert and steppe. The bases of the mountains inclose deep basins, filled with the deposits of parts of the Tertiary sea, as, for example, in the Aralo-Caspian basin. The surface is mantled and sharp contours are obscured by eolian masses of sand and dust. Thus we have also toward the Altai, the Dzungarian basin, and, on the south, toward Tibet, the Tarim basin. The eastern mountains disappear in the desert Shamo (Gobi), and the western go over into the Aralo-Caspian territory. The oasis border at the foot of the mountains is subject to the curse of this proximity. Step by step the destroying sands threaten the fruitful strips between the mountains and the desert.

The author disclaims any intention of presenting a scientific classification of the different groups of the Tian Shan, and cites the Alps, as showing how difficult this is, even for our best-known mountain systems. The chief feature of the horizontal arrangement has already been stated, viz., a departure from the east by west line, in two directions, though the N. E. by S. W. direction is the prevalent one. Coming to the vertical relations, there appears with great regularity as one advances from north to south a rise of absolute altitudes, with lessening of relative heights of mountains above the included valleys. Along the longitudinal axis the altitudes drop toward the east and toward the west, from the central portions of the system. A series of instructive tables shows the altitudes in metres, whether by barometer or by estimate, with the authority for the same. The largest water body within the field is Lake Balkhash, on the plains northward, at an altitude of 270 m. (886 feet.) The most northerly great range is the Dzungarian Ala-tau with heights of more than 3900 m. (12,850 feet). The snow line on the north slope is at 3050–3200 m. (10,060–10,550 feet). Semenov gives the following view of the zones of this range:

1.—Steppe zone, 160–480 m. (550–1600 feet).
2.—Culture zone, good tillage, 480–1300 m. (1600–4300 feet).
3.—Evergreen trees, 1300–2470 m. (4300–8130 feet).
4.—Alpine meadow zone, 2470–2900 m. (8130–9540 feet). Summer station of nomads.
5.—High Alpine zone, 2900–3640 m. (9540–11,995 feet).
6.—Eternal snow.

South and east of the above we find the Iren-khabirgan range, with great heights, 5000–6000 m. (16,460–19,740 feet); the Ili basin, 600–700 m. (1995–2325 feet); and the great Dzungarian basin, 230–700 m. (780–2325 feet). South of this basin is the Bogdo-ola, 4,000–6,000 m. (13,175–19,740 feet); and directly south of this we come upon the Turfan depression, marking levels of 50–70 m. (190–255 feet) *below sea-level.*

Turning to the west half of the Tian Shan system, we find the summits of the northern ranges having maximum altitudes of 4,200–4,800 m. (13,860–15,825 feet), the passes 1500–3000 m. (4950–9870 feet), or more, while the steppes at the foot of the mountains are 600–800 m. (2000–2650 feet) above sea-level. The grand culmination of the entire system is in its south central portion, the Khan-Tengri, with altitudes of 6000–7200 m. (19740–23700 feet). This is also an important centre of powerful and well-known glaciers.

The valleys now or formerly occupied by lakes range from 1615 m. (5300 feet) (Issyk-kul) and 1850 m. (6070 feet) (Kotchkar Basin) to 2873 m. (9426 feet) (Son-kul) and 3450 m. (11,319 feet) (Chatyr-kul).

The Tarim basin on the south of the Tian Shan is a high and large desert area—a most characteristic feature of Central Asia. A girdle of oasis runs along the watered base of the mountains. Far more favorable is the condition of the Ferghana valley on the west, with its flourishing settlements, and opening down by a gap in the mountains to the Aralo-Caspian depression.

There are two chief types of streams: (1) Those which extend east and west along lines of folding, in longitudinal valleys; (2) streams flowing across these lines, from the mountains down to the steppes and deserts and especially from the higher southerly to the lower northerly parts of the system. The drainage is continental—that is, all goes into inland seas, or disappears by evaporation or by infiltrations into the porous waste slopes bordering the mountains. Most of the great longitudinal streams enter these inland seas or lakes. The watersheds not seldom abandon the higher ranges and follow the lower. Watersheds of the second order, due to headward erosion, often separate two streams flowing in opposite directions in longitudinal valleys. Most of these longitudinal trunk streams are believed to occupy genuine synclinal valleys.

An interesting account is given of deposits in high valleys, believed by Richthofen to be of subaerial origin, but held by Semenov and others to be lake deposits. The author holds the former theory untenable in view of many explicit descriptions of the deposits as stratified, but admits the active cooperation of atmospheric agents.

Many of the transverse valleys are believed to have originated as outlet channels of ancient and elevated lakes. The outlet of Son-kul is cited as a present concrete case, and other probable examples are given. The space allotted to this review does not permit reference to the geological formations or to the interesting chapter on the climate and its effect on the morphology of the region.

A. P. B.

ACCESSIONS TO THE LIBRARY.

MARCH–APRIL, 1900.

BY PURCHASE.

Iceland, Its Volcanoes, Geysers and Glaciers, by Chas. S. Forbes, London, 1860, 8vo; History of Long Island, by Benj. F. Thompson, New York, 1839, 8vo; 'Twixt Greek and Turk, by M. Valentine Chirol, Edinburgh and London, 1881, 8vo; A Voyago to Arabia the Happy, etc. (Jean de La Roque), London, 1720, 12mo; Indianer und Anglo-Amerikaner, von Georg Friederici, Braunschweig, 1900, 8vo; Palms and Pearls, or Scenes in Ceylon, by Alan Walters, London, 1892, 8vo; Last Days of Knickerbocker Life in New York, by Abram C. Dayton, New York and London, 1897, 8vo; Atlas von China (1te Abth.), Ferdinand Fr. von Richthofen, Berlin, 1885, folio; Andrees Allgemeiner Handatlas (4te Auflage), A. Scobel und R. Andree, Bielefeld und Leipzig, 1899, folio; History of the Orkney Islands, by G. Barry, Edinburgh, 1805, 4to; The Evolution ot Geography, by John Keane, London, 1899, 8vo; In Moorish Captivity, by Henry M. Grey, London, 1899, 8vo; Byzantine Constantinople, by Alexander Van Millingen, London, 1899, 8vo; Historical Geography, of the Holy Land, by George Adam Smith, London, 1898, 8vo; Southern Arabia, by Theodore Bent and Mrs. Theodore Bent, London, 1900, 8vo; Temperate Chile, by W. Anderson Smith, London, 1899, 8vo; A Short Memoir of Mohammed Ali, by Sir C. A. Murray, London, 1898, 8vo; Behind an Eastern Veil, by C. J. Wills, New Edition, Edinburgh and London (1894), 8vo; In the Land of the Lion and the Sun, by C. J. Wills, London, 1883, 8vo; The Expansion of Egypt, by Arthur Silva White, London, 1899, 8vo; The Victoria Nyanza, by Paul Kollmann, London, 1899, 8vo; Findlay's Directories of the Oceans, London, 1882–1895, 6 vols., 8vo; The Lake Country, by E. Lynn Linton, London, 1864, 8vo; Settlement and Early History of Albany, by William Barnes, Albany, 1864, 8vo; Residence at the Court of London, 1819–1825, by Richard Rush, London, 1845, 8vo; Cosas de España, by Mrs. Wm. Pitt Byrne, London, 1866, 2 vols., 8vo; A Visit to St. Petersburg, 1829–1830, by Thomas Raikes, London, 1838, 8vo; A Land Journey from Asia to Europe, by William Athenry Whyte, London, 1871, 8vo; Picturesque Sketches of Greece and Turkey, by Aubrey De Vere, London, 1850, 2 vols., 8vo; The Eagle's Nest in the Valley of Sixt, by Alfred Wills, London, 1860, 8vo; Summer and Winter in the Pyrenees (Mrs. Sarah S. Ellis), London (1841), 8vo; An Historical and Descriptive Narrative of the Mammoth Cave of Kentucky, by W. Stump Forwood, Philadelphia, 1870, 8vo; The Nooks and By Ways of Italy, by Craufurd Tait Ramage, Liverpool, 1868, 8vo; Minerva, Vol. IX, K. Trübner und F. Mentz, Strassburg, 1900, 8vo; Modern Spain, 1788–1898, by Martin A. S. Hume, New York, 1900, 8vo; Africa, Its Partition and Its Future, by H. M. Stanley and others, New York, 1898, 8vo; Among the Matabele, by Rev. D. Carnegie, 2nd Edition, London, 1894, 8vo; The Nicaragua Canal, by William E. Simmons, New York, 1900, 8vo; The Transvaal Outlook, by Albert Stickney, New York, 1900, 8vo; A Woman's Part in a Revolution, by Mrs. John Hays Hammond, New York, 1897, 16mo; White Man's Africa, by Poultney Bigelow, New York, 1900, 8vo; The Story of the Boers, by C. W. Van der Hoogt, London, 1900, 8vo; The War in South Africa, by J. A. Hobson, New York, 1900, 8vo; A Short History of British Colonial Policy, by H. E. Egerton, London, 1897, 8vo; The Transvaal from Within, by J. P. Fitzpatrick, New York, 1900, 8vo; The Federal Census: Critical Essays by Members of the American

Economic Association, New York, 1899, 8vo; Alone Through Syria, by Ellen E. Miller, London, 1891, 8vo; Kars and Erzeroum: with Campaigns of 1828 and 1829, by Lieut.-Gen. W. Monteith, London, 1856, 8vo; Dictionary, Hindustani and English, by Duncan Forbes, 2d edition, London, 1862, 8vo; The Cape and the Kafirs, by Alfred W. Cole, Paris, 1852, 8vo; Charters and General Laws of the Colony and Province of Massachusetts Bay, Boston, 1814, 8vo; Account of a Tour in Normandy (Dawson Turner), London, 1820, 2 vols. 8vo; Negro Myths from the Georgia Coast, by C. C. Jones, Jr., Boston, 1888, 16mo; See-Helden: Leben und Thaten der, u. s. w., von V. D. B., Sulzbach (1686), 4to; The Annual American Catalogue, 1899 (English Catalogue added), edited by R. R. Bowker, New York, 1900, 8vo; The Jesuit Relations and Allied Documents, edited by Reuben Gold Thwaites, Vols. LXIII–LXIV, Cleveland, 1900, 8vo; History of New Hampshire, from its First Discovery to the Year 1830, by E. D. Sanborn, Manchester, N. H., 1875, 8vo; Geological Survey of Michigan, 5 vols. 8vo and atlas folio, New York, 1873–1881, Lansing, 1895; The Key to South Africa, Delagoa Bay, by Montague George Jessett, London, 1899, 8vo; Dictionary of National Biography, edited by Sidney Lee, Vol. LXII, London, 1900, 8vo; Cities and Towns of China, by G. M. H. Playfair, Hong Kong, 1879, 8vo; Natural History Lore and Legend, by F. Edward Hulme, London, 1895, 8vo; A Marine Pocket Dictionary of the Italian, Spanish, Portuguese and German Languages, etc., by Henry Neuman, London, 1800, 8vo; The Annual Literary Index for 1899, W. I. Fletcher and R. R. Bowker, New York, 1900, 8vo; Une Femme chez les Sahariennes, par M^me^ Jean Pommerol, Paris (1900), 8vo; Notes sur l'Inde, par le Prince Bojidar Karageorgevitch, Paris (1900), 8vo; Letters Received by the East India Company from Its Servants in the East, 1602–1615, edited by W. Foster, London, 1896–1899, 3 vols. 8vo; Voyage dans le Nord du Brésil, 1613 et 1614, par le Père Yves d'Evreux, Leipzig and Paris, 1864, 8vo; Excavations at Carnac (Brittany), Researches at Kermario, by James Miln, Edinburgh, 1881, 8vo; British Empire Series: Vol. I, India, etc., Vol. II, British Africa, by various authors, London, 1899, 8vo; In Dwarf Land and Cannibal Country, by A. B. Lloyd, London, 1899, 8vo; Atti del Terzo Congresso Geografico Italiano (Volume Secondo), Aprile, 1898. Firenze, 1899, 8vo; Le Sahara Algérien, par le Lieut.-Col. (E.) Daumas, Paris, 1845, 8vo; A Classical Dictionary of India, by John Garrett, Madras, 1871, 8vo; From the Alps to the Andes, by Mattias Zurbriggen, London, 1899, 8vo; Le Brésil, par E. Levasseur, et autres, Paris, 1889, 4to; Biografías de Mexicanos Distinguidos, Francisco Sosa, Mexico, 1884, 8vo; New York, Past, Present and Future, etc., by E. Porter Belden, New York, 1849, 12mo; Visit to the Monastery of La Trappe, by W. D. Fellowes, London, 1823, 8vo; The Gold Mines of the Rand, by F. H. Hatch and J. A. Chalmers, London, 1895, 8vo; Our South African Empire, by William Greswell, London, 1885, 2 vols. 8vo; Yaman, Its Early Mediæval History, the Original Texts, with Translation and Notes by Henry Cassels Kay, London, 1892, 8vo; Catalogue of Maps, Plans and Views of London, etc., collected, etc., by Frederick Crace, London, 1878, 8vo; Sketches in Sunshine and Storm, by W. J. Knox Little, London, 1892, 8vo; Gazetteer of New Hampshire, by J. Farmer and J. B. Moore, Concord, 1823, 12mo; An Inquiry into the Origin of the Antiquities of America, by John Delafield, Jr., New York, 1839, 4to; The History of the First West India Regiment, by A. B. Ellis, London, 1885, 8vo; The New York Directory for 1786, by David Franks, New York, 1786, square 12mo (reprint, 1875); Six Mois dans l'Attié (Côte d' Ivoire), par Camille Dreyfus, Paris (1898), 12mo; La Rénovation de l'Asie, par Pierre Leroy-Beaulieu, Paris, 1900, 16mo; Java et ses habitants, par J. Chailley-Bert, Paris, 1900, 16mo; Life of Hernando Cortes, by Arthur Helps, London, 1871, 2 vols. 8vo; Life of Pizarro, by Arthur Helps, London, 1869, 2d Edition, 8vo; A

Journey Through Texas, by Frederick Law Olmsted, New York, 1857, 12mo; The Military and Civil History of the County of Essex, New York, by Winslow C. Watson, Albany, 1869, 8vo; A Russian Province of the North, by Alexander Platonovich Engelhardt, Westminster, 1899, 8vo; Sailing Alone Around the World, by Captain Joshua Slocum, New York, 1900, 8vo; Notes on Sport and Travel, by George Henry Kingsley, London, 1900, 8vo; Cities of Belgium, by Grant Allen, New York, 1900, 16mo; Venice, by Grant Allen, New York, 1900, 16mo; The Transvaal War, by J. Westlake, London, 1899, 8vo; The Story of Moscow, by Wirt Gerrare, London, 1900, 16mo; History of the Colonization of Africa, by Sir H. H. Johnston, Cambridge, 1899, 8vo.

GIFTS.

From W. Bell Dawson, Author:

Illustrations of Remarkable Secondary Tidal Undulations in January, 1899, as registered on Recording Tide Gauges in the Region of Nova Scotia. Extract from the Transactions of the Royal Society of Canada, Second Series, Vol. V, Section III. Toronto, 1899.

"Donation through a Member from Friends":

Atlas of Various States and Countries, principally by Morse and Bruce (various dates); Drawing of the ship Eureka; Sandwich Islands, Admiralty Chart, Sept. 6, 1843, London; Canton River, J. Horsburgh, July, 1831, corrected to June 4, 1847, London; Strait of Sunda, J. Horsburgh, June 4, 1813, corrected to 1845, London; North Atlantic, E. & G. W. Blunt, 1844, additions to 1847, New York; Bahama Banks and Gulf of Florida, E. Blunt, 1848, additions to 1853, New York; Gulf of Mexico, West Indies and the Spanish Main, E. & G. W. Blunt, 1845, additions to 1852, New York; Carte Générale de la Mer Mediterranée, etc., Maistre, Marseilles, 1849 (2 sheets); China Sea, East Indian Archipelago, by J. W. Norie, 1821, London; Chart to Book of Navigation in the East Indies, J. Horsburgh, Jan. 1, 1819, additions to 1849, London; Pilot Chart, North Atlantic, M. F. Maury, Sheet No 1, 1849, Washington (in all, 10 charts).

From Guillaume Grandidier, Author:

Voyage dans le Sud-ouest de Madagascar, Conférence faite à la Société de Géographie (de Paris), le 5 Janvier, 1900.

From Jules Leclercq, Author:

À Travers l'Afrique Australe, 2e édition, Paris, 1900, 18°; Anurádhapura sous les Rois Cinghalais, Bruxelles, 1900, 8°; Extrait des *Bulletins de l'Académie royale de Belgique* (Classe des lettres, etc.), N° 1 (janvier), 1900;—La Réforme Sociale: Bulletin de la Société d'Économie Sociale, etc., No 93, 1er Janvier, 1900, *contenant* "Les Boers et leur État Social," par Jules Leclercq. Paris, 1900.

From the Macmillan Co., Publishers, New York:

First Book Home Geography and the Earth as a Whole, by Ralph S. Tarr and Frank M. McMurry, New York, 1900, sq. 8°.

From Dr. Fridtjof Nansen:

Norwegian North Polar Expedition, 1893–1896: Scientific Results, Vol. I, edited by Fridtjof Nansen, Christiania, et al., 1900, 4°.

From E. L. Plumb:

Remarks of Hon. John D. Bellamy, of North Carolina, in the House of Representatives, Thursday, February 1, 1900. Washington, 1900, p. 8°.

From Charles Schuchert, Author:

On the Lower Silurian (Trenton) Fauna of Baffin Land. From the Proceedings of the U. S. National Museum, Vol. XXII. Washington, 1900, p. 8°.

NOTES AND NEWS.

THE AMERICAN MUSEUM JOURNAL, Vol. 1, No. 1, April, 1900, is the first number of a new publication, intended to be a record of the progress of the American Museum of Natural History.

It is a handsome illustrated octavo, of sixteen pages, edited by W. K. Gregory, with Frank M. Chapman and L. P. Gratacap as Associate Editors, and will be furnished to subscribers monthly, except in June, July, August and September, for seventy-five cents a year. Address A. Woodward, American Museum of Natural History, 77th Street and Central Park, West.

MINERVA, for 1899–1900, has for its frontispiece an admirable portrait of President Eliot of Harvard University, described in the *Vorwort* as the foremost of the prominent men who represent the higher education in the United States.

There is a steady growth in the number of references in *Minerva*, which now contains 1,166 pages, beautifully printed and with the minimum of error in so many thousand strange names. It is only in the two pages of the *Vorwort* that the printer has nodded, setting up in one place *Un dunter* for *Und unter*, and in another *Jür* for *Für*.

VOLUME LXII OF THE DICTIONARY OF NATIONAL BIOGRAPHY begins with the notice of Sir Adam Williamson (1736–1798), and closes with that of Wynkyn de Worde, the famous printer.

It is announced that the concluding volume of the Dictionary will be published in June, and with it subscribers will receive an index to each of the volumes 1–14, issued without indexes.

M. AUGUSTE DESCAMPS, in an article in the *Bulletin* of the Lille Geographical Society, No. 9, for 1899, notes the persistence of the Arab type in the population of certain villages in the east and south of France.

Fugitives from the battlefield of Poitiers in 732 took refuge, it is affirmed, in the region between the Saône and the Rhone, and their descendants, many of whom bear Saracen names, such as Cafoud, Buiroz, Salladin, Roum, look like Orientals, with their thin, dark faces, aquiline noses and penetrating black eyes.

The best-known Arab colonies are at Boz and Uchizy. At

Uchizy M. Descamps found an innkeeper and his family with the thick black hair and vivid eyes, the bronze faces and high, keen features of Algeria. A Parisian artist was sketching them as types for a Biblical composition, and they had the Arab gravity and dignity of bearing. Living on the frontier of Burgundy, the people of Uchizy inherit the Mohammedan aversion to wine.

THE JUSTIN WINSOR PRIZE of $100, offered by the American Historical Association, will be awarded this year for the best monograph based upon original investigation in American history. The work must be typewritten, or written upon only one side of the sheet, and ready for publication. Clearness, arrangement and literary form will be considered in making the award, and the successful essay will be published by the Association.

Prof. Charles M. Andrews, of Bryn Mawr, is the Chairman of the Committee.

LA REVUE DE GÉOGRAPHIE prints in its number for April, under the title of *Le livre d'or de la géographie*, the first part of an attempt at a geographical biography by M. P. Lemosof, covering the names from Abbadie to Azurara. In a brief introduction the author asks for the indulgence of his readers and invites them to suggest names worthy to figure in his list, which ranges through the world from antiquity to the present day.

It is not easy to understand the principle which has guided M. Lemosof. He finds a place for Agatharchides, but he omits Acuña, Adam of Bremen, Æneas Sylvius, Agrippa, Alfred the Great, and Aristotle. Abulfeda is duly registered, but Abdallatif is forgotten, and there is no mention of Azara.

If, as stated in the Introduction, the list is no more than a simple enumeration of names and dates, these should be correctly given.

Adam Afzelius is described in two lines as a Swedish savant, who was born in 1796 and lived for long years in Senegal. According to the biographical dictionaries Afzelius was born in 1750. He visited Sierra Leone in 1792, and in 1796 he was the Secretary of the Swedish Embassy in London.

In the notice of Louis Agassiz, it is said that he filled the chair of natural history at *New-Cambridge* (United States); that his journey in Brazil gave him his celebrity, and that his principal publication was *A Journey in Brazil*.

This appreciation of Agassiz is hardly relieved by the brilliant discovery of New-Cambridge.

Of Eivind Astrup M. Lemosof writes that he was a Swedish explorer, a member of the Peary expedition to the North Pole, and that he met his death in that enterprise in 1896.

Astrup was a Norwegian, not a Swede. He went with Peary in 1891, not to the North Pole, but to Greenland, and returned in 1892. He met his death in 1896, no one knows how, in the woods in Southern Norway.

There is room for improvement in the *Golden Book of Geography*.

THE OSTSCHWEIZERISCHE GEOGRAPHISCH-KOMMERZ. GESELLSCHAFT of St. Gallen makes known the death, on the 26th of March, of its Vice-President, Herr Konsul Otto Dürler, at the age of fifty-five years. Herr Dürler had lived for a long time at Batavia, where he was Swiss Consul, and returned to his home in 1892, apparently well, but with vitality impaired by the climate of Java.

TRANSACTIONS OF THE SOCIETY.

MARCH–APRIL, 1900.

A Regular Meeting of the Society was held at Chickering Hall, Fifth Avenue and Eighteenth Street, on Monday, March 19, at 8.30 o'clock P.M.

Vice-President Tiffany in the chair.

Mr. Thomas McCaleb, recommended by the Council, was elected a Fellow.

The Chairman announced that the present meeting would close the relations maintained for so many years with Chickering Hall, now to be turned to other uses.

He then introduced the speaker of the evening, President Schurman, of Cornell University, who addressed the Society on the Philippine Islands and their People.

On motion, the Society adjourned.

A Regular Meeting of the Society was held at Mendelssohn Hall, No. 110 West Fortieth Street, on Tuesday, April 17, at 8.30 o'clock P.M.

Vice-President Moore in the chair.

The Chairman called for the report of the Nominating Committee, which was read by Mr. Henry Parish, as follows:

AMERICAN GEOGRAPHICAL SOCIETY.

APRIL 7, 1900.

The Committee appointed by the Council on the 9th of December, 1899, to recommend suitable persons to fill vacancies in the offices of the Society, and which reported in part in January, 1900, now makes final report and recommends the election of the Hon. Seth Low to the office of President.

HENRY PARISH,
CHANDLER ROBBINS,
LEVI HOLBROOK,
Committee.

The Chairman asked for a *viva voce* vote on the nomination, and Mr. Low was unanimously elected.

The speaker of the evening, Mr. H. L. Bridgman, was then introduced. He described the cruise of the *Diana* to Greenland in 1899, and Mr. Peary's work in the Arctic in 1898–99.

On motion, the Society adjourned.

Correction.

It is requested that the following lines be made to take the place of the last 12 lines on page 137 and the first and second lines on page 138, in Bulletin No. 2, 1900:

Luzon, you have a tribe called the Vicols, numbering nearly half a million of people. They are entirely distinct from the Tagalos, using a language which these cannot understand.

North of the Tagalos and occupying the central portion of the island of Luzon, you have the Pampangos, 365,000 of them, and the Pangasinanes, 340,000 of them, each again with a distinct language different from one another and different from all the other languages of the archipelago.

And finally, to the north of Luzon, on the side of the China Sea, you have the Ilocanos, who number between four and five hundred thousand people. And then, on the other side, on the Pacific Ocean side, in the valley of the great Cagayan, where the best tobacco in the world is raised, you have the Cagayanes, numbering nearly 200,000.